ISIRR 2009
ROMANIA - HUNGARY - SERBIA

REAL-TIME MULTIPLEX PCR ASSAY FOR INVESTIGATION OF THE KINESIN LIGHT-CHAIN 1 GENE A185C AND C406T MUTATIONS

[1]Ferenc SOMOGYVÁRI, [2]Zoltán SZOLNOKI, [3]Lívia DÉZSI, [1]Yvette MÁNDI

[1]Department of Medical Microbiology and Immunobiology, Faculty of Medicine, University of Szeged, Szeged, HUNGARY; [2]Department of Cerebrovascular Diseases, Pándy Kálmán County Hospital, Gyula, HUNGARY; [3]Neurology Department, Faculty of Medicine, University of Szeged, Szeged, HUNGARY

ABSTRACT

The kinesin is the main motor protein in the trafficking system of the mitochondria and other organelles. Genetic variants affecting the function of kinesin were earlier found to be associated with cognitive disturbances and neurodegeneration. A multiplex polymerase chain reaction (mPCR) method, allowing the simultaneous detection of the KNS2 A185C (rs_1054080) and C406T (rs_3742465) mutations has been developed. The new assay was validated by PCR-RFLP experiments: the proposed method and the PCR-RFLP analysis yielded identical results. This suggests the applicability of the mPCR assay for the investigation of KNS2 mutations in population studies.

KEYWORDS

kinesin; light chain; KNS2 mutations; multiplex PCR

1. INTRODUCTION

The kinesins are main cytoskeleton motor proteins whose function is to transport organelles within cells [2]. These are tetrameric proteins comprising 2 heavy chains (alpha chains, KNS1) and 2 light chains (beta chains, KNS2) [6]. The KNS1 chains provide the tubulin binding site and the ATPase domains, whereas the KNS2 chains are responsible for the specific attachment of the organelle to be moved by the kinesin tetramer. One special transport mediated by direct binding to the kinesin is the axonal moving of amyloid precursor protein carrying vesicles [7]. This transport is inhibited by overexpression of the *tau* protein [4], and this mechanism is enhanced by oxidative stress [10]. Thus, the amyloid precursor protein can be retained in the cells, thereby promoting the accumulation of amyloid β-peptides in the cytoplasm. Both the aggregation of the *tau* protein into abnormal filaments and the accumulated amyloid β plaques are specific for Alzheimer's disease (AD) [5].

Dhaenens et al. hypothesized that a KNS2 dysfunction plays a role in the pathogenesis of AD [3] and investigated the occurrence of three KNS2 polymorphisms in AD. Two of them, in the 5'UTR region (A185C and C406T), displayed no association, while the KNS2 G56836C mutation, located in intron 13 (mistyped by Dhaenens et al., and known as KNS2 G58836), exhibited an association with AD [3, 1]. This association for the KNS2 G56836C variant may result from an altered splicing effect [8].

Kinesins have been presumed to play a role in the pathomechanism of leukoaraiosis, which brings about a cognitive decline in a considerable proportion of the middle-aged and elderly [11]. In large population studies, the investigation of these polymorphisms via the recommended PCR-RFLP method [3] is laborious, expensive and time-consuming.

2. THE STUDY

A real-time PCR (LightCycler 1.5, Roche) assay with melting point analysis has been developed: KNS2 A185C (rs_1054080) and C406T (rs_3742465) mutations were investigated in multiplex PCR reaction. Primers described earlier [3], was modified for equal annealing temperatures which is necessary for the simultaneous amplification. Optimised primer and probe sequences and their concentrations are listed in Table 1.

Table 1. The sequences of the primers and probes

Primers/probes	Sequences	Cc (μM)
KNS2 A185C		
KNS185 for	AgCgggACTggCTggg	0.4
KNS185 rev	TCggCTgTgTgAggCACg	0.4
KNS185 probe	Flu-CCCCTCgCTggTgACTgCT-Ph	0.3
KNS185 anch	TgCggggCggTAgCTCCg-LCRed640	0.3
KNS2 C406T		
KNS406 for	TCCCTgTCCCgCTCCTCTTC	0.4
KNS406 rev	gACAAgAACCCgACCTgAACCTAgAAg	0.4
KNS406 probe	CCgCAACTCTgTCCCCATCCA-LCRed705	0.2
KNS406 anch	Flu-gCCTCCTTCCCggTTTggTCCCg-Ph	0.2

The experimental protocol was the following: Genomic DNA was extracted from 200 μL of peripheral blood anticoagulated with EDTA [9]. All blood samples were kept at –20°C until DNA isolation. PCR was performed in disposable capillaries (Roche Diagnostics). The reaction (10 μL) contained 1 μL of DNA (40-80 ng), 0.4 μM of each of the primers, 1 μL of buffer (LightCycler DNA master hybridization probes 10X buffer, Roche), 0.4 μL of 25 mM $MgCl_2$ stock solution, 0.6 μL of DMSO and the probes (concentrations listed in Table 1). The PCR conditions were: initial denaturation at 95°C for 60 s, followed by 40 cycles of denaturation (95°C for 0 s, 20°C/s), annealing (60°C for 10 s, 20°C/s), and extension (72°C for 12 s, 20 °C/s).

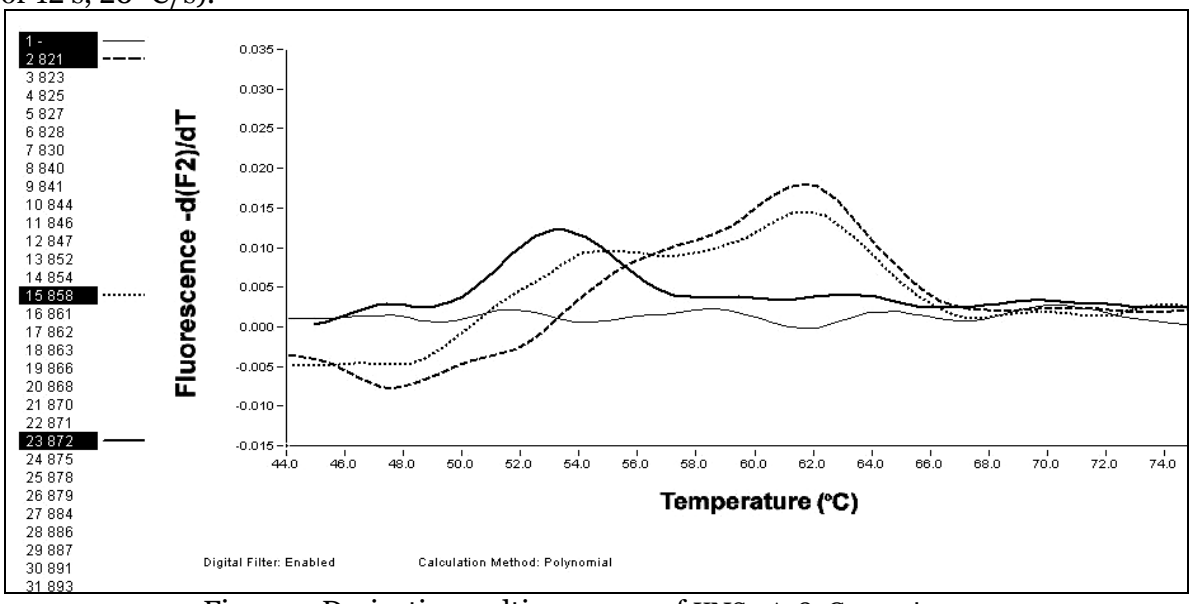


Figure 1. Derivative melting curves of KNS2 A185C genotypes.
(---- C/C, —— A/A, ····· C/A)

The melting curve analysis consisted of 1 cycle at 95 °C for 10 s, 40 °C for 10 s, and then increase of the temperature to 75 °C at 0.2 °C/s. The fluorescence signal (F) was monitored continuously during the temperature ramp and then plotted against temperature (T). These curves were transformed to derivative melting curves [(-dF/dT) vs. T]. The KNS2 A185C mutation analysis was happened in the F2 channel (640 nm, Fig. 1.) and the C406T mutation analysis in the F3 channel (705 nm, Fig. 2.)

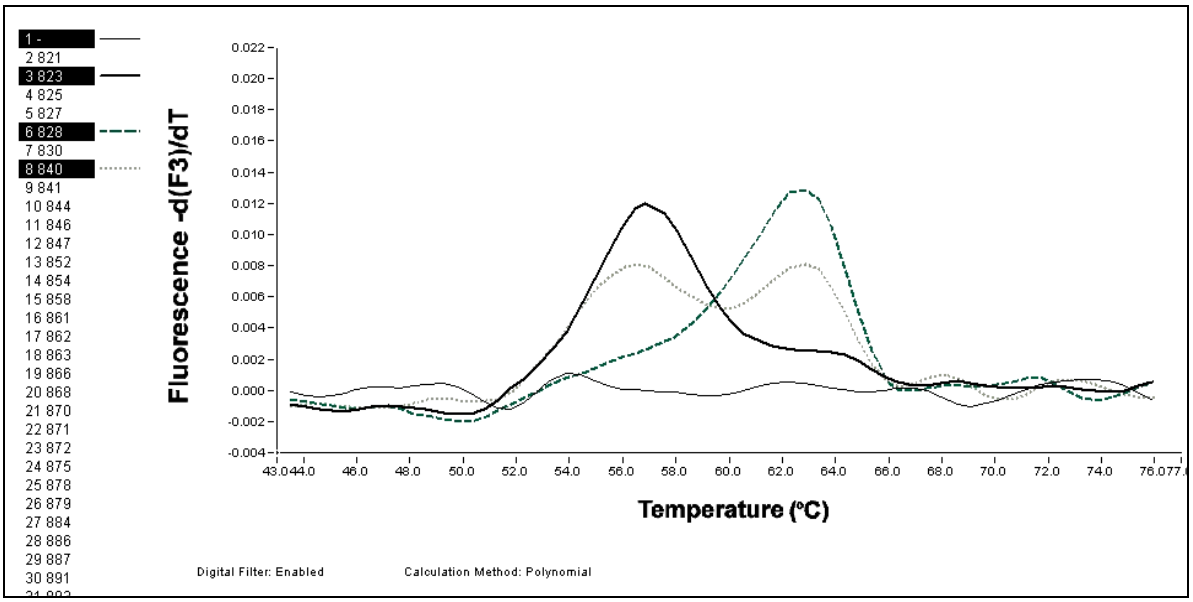


Figure 1. Derivative melting curves of KNS2 C406T genotypes.
(---- C/C, —— T/T, ····· C/T)

3. ANALYSIS AND DISCUSSION

The new mPCR assay and PCR-RFLP method yielded identical results (tested in 25 cases each): the melting temperatures and restriction fragment lengths are listed in Table 2. Among 251 control patient samples, the genotypes were KNS2 AA185: 16 (6.4%); KNS2 A185C: 104 (41.4%); KNS2 185CC: 131 (52.2%); KNS2 CC406: 143 (56.9%); KNS2 C406T: 94 (37.5%) and KNS2 406TT: 16 (5.6%). The allele frequencies are listed in Table 2. These data are comparable to those previously documented in Caucasian controls [3].

Table 2. Melting temperatures, RFLP lengths and allele frequencies of different genotypes.
*In the original article [7], the isoschizomer *Bfa*I (New England Biolabs) was used. The restriction enzymes originated from Roche Diagnostics (Mannheim, Germany).

Alleles	Tm (°C)	RFLP (bp)	Allele frequency (%)
KNS A185C		*Mae*I*	
A	50.6	120+37	27.1
C	56.5	157	72.9
KNS C406T		*Mae*III	
C	63.0	167	75.7
T	57.0	132+35	24.3

4. CONCLUSIONS

The results obtained suggest the applicability of the new multiplex PCR assay for the investigation of KNS2 mutations in population studies without the disadvantages of the RFLP-based approaches.

REFERENCES

[1] Andersson ME, Sjolander A, Andreasen N et al.: Kinesin gene variability may affect tau phosphorylation in early Alzheimer's disease. Int J Mol Med 20, 233-239 (2007).
[2] Chernajovsky Y, Brown A, Clark J: Human kinesin light (beta) chain gene: DNA sequence and functional characterization of its promoter and first exon. DNA Cell Biol 15, 965-974 (1996).
[3] Dhaenens CM, Van Brussel E, Schraen-Maschke S, Pasquier F, Delacourte A, Sablonniere B: Association study of three polymorphisms of kinesin light chain 1 gene with Alzheimer's disease. Neurosci Lett 368, 290-292 (2004).

[4] Ebneth A, Godeman R, Stamer K, Illenberger S, Trinczek B, Mandelkow E: Overexpression of tau protein inhibits kinesin-dependent trafficking of vesicles, mitochondria, and endoplasmic reticulum: implications for Alzheimer's disease. J Cell Biol 143, 777-794 (1998).
[5] George HPS, Rossor M: Alzheimer's disease. Unravelling the disease process. Lancet 358, S1 (2001).
[6] Goldstein LS: Molecular motors: from one motor many tails to one motor many tales. Trends Cell Biol 11, 477-482 (2001).
[7] Kamal A, Stokin GB, Yang Z, Xia C, Goldstein LS: Axonal transport of amyloid precursor protein is mediated by direct binding to the kinesin light chain subunit of kinesin-I. Neuron 28, 449-459 (2000).
[8] McCart AE, Mahony D, Rothnagel AJ: Alternatively spliced products of the human kinesin light chain 1 (KNS2) gene. Traffic 4, 576-580 (2003).
[9] Miller SA, Dykes DD, Polesky HF: A simple salting out procedure for extracting DNA from human nucleated cells. Nucleic Acids Res 16, 1215-1218 (1988).
[10] Stamer K, Vogel R, Thies E, Mandelkow E, Mandelkow EM: Tau blocks traffic of organelles, neurofilaments, and APP vesicles in neurons and enhances oxidative stress. J Cell Biol 156, 1051-1063 (2002).
[11] Szolnoki Z: Pathomechanism of leukoaraiosis: a molecular bridge between the genetic, biochemical, and clinical processes (a mitochondrial hypothesis). Neuromol Med 9, 21-33 (2007).

NEONATAL SURGERY IN SZEGED, HUNGARY

Tamás MILASSIN, László JUHASZ, Szabolcs TORNYOS, Sándor TURI

Department of Pediatrics, University of Szeged, HUNGARY

Abstract

Our clinic is a tertiary level center. We provide surgical service of almost every kind for the four south-eastern counties of Hungary. Furthermore we have increasing numbers of patients from the neighboring regions of Romania and Serbia.

We perform general surgery (thoracic, abdominal surgery, including tumors), urology, traumatology and neonatal surgery. We also care for patients in limited fields of orthopedics, neurosurgery, bronchology and plastic surgery. Recently we have a trend toward performing minimally invasive surgery.

Within neonatal surgery we operate on babies having congenital malformations or acquired diseases for example of the digestive, inspiratory or genitourinary systems. Sometimes we treat exceptionally rare cases, like conjoined twins.

We would like to demonstrate our comprehensive activities. We also encourage all our colleagues in the region to feel free to ask our help, should they encounter a complicated case.

The Pediatric Clinic of the University of Szeged is a tertiary medical center. The Department of Pediatric Surgery provides surgical service for the four south-eastern counties in Hungary. We have patients of all ages from birth to adolescence. Occasionally children are referred to us from remote areas of the country, even from abroad, mostly from the neighboring regions of Romania and Serbia.

We perform general surgery (thoracic, abdominal surgery, including tumors), urology, traumatology and neonatal surgery. We also care for patients in limited fields of orthopedics, neurosurgery, bronchology and plastic surgery. Recently we have a trend toward performing minimally invasive surgery.

A child is a unique surgical patient who is physically and physiologically different from an adult. The differences between children and adults are most marked immediately after birth, when the infant is adapting to extrauterine life. Being one of the four medical universities in Hungary, we are capable of managing almost every possible surgical problem in the newborn. Modern diagnostic modalities are available, including measuring laboratory parameters of body fluids, various radiological techniques like ultrasound, X-ray, computer tomography (CT), magnetic resonance imaging (MR), prenatal ultrasound, prenatal MR.

We have around the clock neonatal transport service, an ambulance car with experienced staff and modern equipment is practically a moving intensive care unit. Yet, it is important to emphasize the importance of prenatal diagnosis of congenital anomalies and planned delivery in a tertiary center. As we use to say: the best possible transportation for a sick infant is in the mother's womb.

Surgical problems in the neonatal period can be congenital or acquired, and can require immediate medical attention or leave time to the medical team to plan the treatment. There are congenital diseases when surgery plays no role, like in anencephaly, which means the newborn has no brain at all, that is incompatible with life. In other cases, the infant suffers from complex anomalies, affecting multiple organ systems, and has poor chances in life expectancy or quality of life, despite multiple surgeries. Some diseases are diagnosed shortly after birth but operation is done later, like inguinal hernia, undescended testis, cleft lip and palate or hypospadias. In this lecture, we concentrate on classic neonatal surgical diseases, which are surgically correctable. Heart surgery and neurosurgery may also be necessary in the newborn period, although these complex procedures are available in our university, but not in our department, so they won't be discussed.

Intestinal obstruction is the most common surgical emergency of the newborn. The common sign is vomiting and feeding intolerance, but the onset and severity depends on the level of obstruction.

Newborns with oesophageal atresia usually have a blind ending upper pouch and the distal part of the oesophagus is connected with the trachea (Figure 1). The baby cannot swallow even his/her own saliva, feeding attempts lead to aspiration. During the operation we close the tracheal fistula and reconstruct the continuity of the oesophagus through a few centimeters long incision.

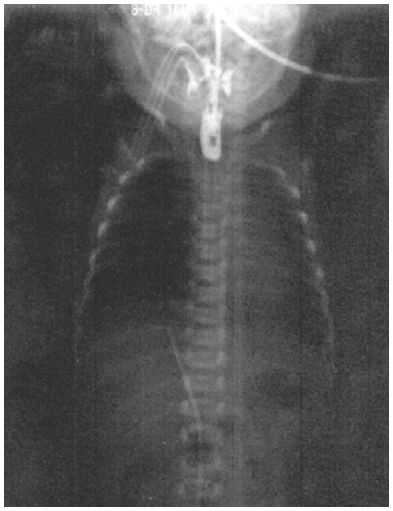


Figure 1: Oesophageal atresia. Note the blind-ending upper pouch

Figure 2: Diaphragmatic hernia. Gastric bubble is in the thoracic cavity

Figure 3:

Duodenal atresia is frequently associated with Down's syndrome. It has characteristic radiographic appearance and nowadays should be diagnosed before birth. There are many different types of the atresia of the small bowel, the operation is performed through laparotomy, and consists of reconstructing the continuity of the intestinal tract. Sometimes a considerably long part of the bowel must be excised.

Less frequently, newborns with malrotation, volvulus, intussusception, intestinal duplications or omphalomesenteric duct remnants need our help.

Many different other diseases, affecting the gastrointestinal system need surgical attention in the newborn, e.g. cystic fibrosis, colonic atresia, anorectal malformations, Hirschsprung-disease. Most of these patients need a palliative colostomy first, the definitive operation can be performed later in life.

Babies with diaphragmatic hernia are born with a hole in their diaphragm, therefore most of the abdominal organs are pushed up into the thoracic cavity, causing impaired development of the lungs (Figure 2). After birth severe pulmonary insufficiency develops and, without complex medical support, the babies die. The operation consists of placing the organs back to the abdomen and closing the diaphragmatic defect.

Discovering severe central nervous system malformations before birth, like meningomyelocele, termination of the pregnancy is offered to the parents, because babies with these anomalies are going to have short and miserable life. Depending on the level of the lesion various symptoms develop, including lower extremity palsy, loss of bladder and bowel control, severe skeletal deformities and hydrocephalus. Should a baby is born with meningomyelocele, the spinal cord must be covered urgently to prevent further injury.

Defects of the abdominal wall, like gastroschisis and omphalocele, not only are severe conditions by themselves, they often combine with other congenital anomalies. Putting back the organs into the abdomen and closing the defect can be extremely challenging (Figure 3).

Various urological anomalies might need surgery in the newborn period to save the affected kidneys from further impairment, e.g. pyeloureteral or ureterovesical stenoses, ureterocele, posterior urethral valve. Different surgical procedures might be needed, from ultrasound-guided percutaneous drainage through ureterostomy to pyelonplasty.

Sometimes, diseases of the gonads require surgical attention. Large ovarian cysts are predisposed to torsion, which stops the blood supply of the organ. Testicles can also undergo torsion. Without operation, the gonads can suffer irreversible necrosis within a few hours. Inguinal hernias can also become incarcerated in the neonate.

Birth injuries can occur at any delivery, but are more frequent during hard labor, breech delivery or in emergency situations, such as bleeding. The injured newborn has significant healing capacity; it is particularly true for the injuries of the musculoskeletal system, while other injuries affecting the nervous system, abdominal or thoracic organs can even be lethal.

We also encounter and operate rare congenital malformations, like biliary atresia, choledochal cysts, cystic adenomatoid malformation of the lungs, congenital lobar emphysema. Various tumors can occur in the newborn, giant sacrococcygeal teratomas for example can actually weigh more than the baby. Sometimes we treat exceptionally rare cases, like conjoined twins.

Hopefully this short lecture has given insight to our comprehensive activities. We would like to encourage all our colleagues in the region to feel free to ask our help, should they encounter a complicated case.

ISIRR 2009 ROMANIA - HUNGARY - SERBIA

GENERAL AND NERVOUS SYSTEM EFFECTS OF LEAD APPLIED IN NANOPARTICULATE FORM INTO THE TRACHEA OF RATS

András PAPP, Leila SÁRKÖZI

Department of Public Health, University of Szeged Faculty of Medicine
H-6720 Szeged, Dóm tér 10, HUNGARY

ABSTRACT

Lead is a heavy metal notoriously harmful for human health and environment. In case of leaded petrol (still in use in certain regions involved in this symposium), and in lead processing and reprocessing industries, airborne particles are emitted, exposing people by inhalation. Nervous system is a primary target of lead, with known consequences like occupational neuropathy and delayed mental development of children. In inhalational exposure, the size of particles entering the airways is crucial. In this study, submicroscopic (mean diameter ca. 20 nm) PbO particles were suspended in distilled water and instilled into the trachea of male Wistar rats (2 and 4 mg/kg), 5 times a week for 3 and 6 weeks. The treated rats' body weight gain was significantly lower than in the controls from the 3rd week on, and the weight of their lungs was significantly increased. Spontaneous cortical activity, recorded in urethane anesthesia, was shifted to higher frequencies in the treated rats. The cortical sensory evoked potentials in the same rats had mostly increased latency, sometimes also increased duration, and decreased frequency following ability on rapid stimulation. Lead in nanosuspension form had access to the brain so the human effects of inhalation of lead nanoparticles can be modelled in rats this way.

1. INTRODUCTION

Exposure by lead-containing airborne particles is seen in occupational settings (smelting, processing and reprocessing of lead) and in the general environment in areas where leaded petrol is till in use. Lead is well absorbed from the alveoli [12] and from the intestines[5]. Airborne lead causes primarily exposure by the airways, where the size of the inhaled particles is a crucial factor. Grains of 10 µm or more are trapped in the upper airways while those of 1-10 µm are typically deposited in the alveoli. Even smaller particles – nanoparticles, ultrafine dust - have been newly recognized as having unique characteristics including pathogenicity. Such tiny particles, depositing either in the nasopharynx or in the alveoli [10] are highly mobile and can cross boundaries like the alveolar and capillary wall by mechanisms specific for this size range (transcytosis by caveola formation [20]). Axonal transport of such particles is also known.

Lead is a neurotoxic metal. In lead-exposed humans, various forms of central and peripheral evoked activity, namely sensory evoked potentials and nerve conduction velocity, were affected [1]. Impaired postural balance was seen in lead-exposed workers [28]. The deleterious effect of childhood lead exposure on IQ development and school performance has been amply documented [7,19]. In our previous studies lead, given orally in organic or inorganic form, altered the cortical electrical activity [17,18] and the memory performance [27] of rats.

In the present work - within the framework of the *Regional University Knowledge Centre for Environmental and Nanotechnology, Szeged, Hungary* - lead oxide (PbO) nanoparticles were produced, and their effects on general toxicological parameters and on the function of the central and peripheral nervous system were investigated in experimentally exposed rats.

2. MATERIALS AND METHODS

The experiments were carried out on adult male Wistar rats (280±20 g body weight at start), obtained at the university's breeding centre. They were housed in an air-conditioned room maintained at 22 °C with a 12-h light/dark cycle (light on at 06:00), and free access to tap water and standard pellet. There were 4 groups of 10 animals each: an untreated control group (Con), a vehicle control group (W), and a low dose (LD) and a high dose (HD) group. The doses applied were equivalent to 2 and 4 mg Pb / kg body weight, and were determined on the basis of data about the ventilation volume of rats [25]; and on published inhalation toxicity effects of lead in rats [6,23].

The PbO nanoparticles were synthesized at the Department of Applied Chemistry, University of Szeged in a dry procedure. Pb-acetate was milled with NaOH and the resulting hydroxide was calcined. Particle size (20 - 30 nm) was determined by X-ray diffraction and transmission electron microscopy. For administration, the nanoparticles were suspended in distilled water, and were instilled into the trachea of the treated rats 5 days a week, for 6 weeks. Before and during administration, the suspension was sonicated to prevent aggregation. The instilled volume was 1.0 ml/kg b.w., the vehicle control (W) group received distilled water. For intratracheal instillation, the animals were quickly anesthetized with diethyl ether in a glass jar with air-tight lid, then were suspended on a tilted (60°) board by hanging the upper incisor teeth in a wire loop which held the animal in place and its mouth open [21]. Focussed light was aimed transdermally on the trachea, the tongue was pulled forward with a pair of non-traumatic forceps, and a custom-made laryngoscope was used to gain access to the glottis. Intratracheal instillation was done by means of a 1 ml syringe and 1.2 mm OD plastic tubing, inserted between the vocal chords.

The rats' body weight was recorded weekly. Symptoms of general toxicity were also observed and noted.

On the day following the last instillation, the animals were prepared for electrophysiological recording. In urethane anesthesia (1000 mg/kg b.w ip.), the animal's head was fixed in a stereotaxic frame, and the left hemisphere was exposed by opening the bony skull. Lidocaine (10%) was sprayed on the wounds, and the exposed dura was protected by a thin layer of petroleum jelly. After 30 minutes recovery, silver electrodes were placed on the primary somatosensory (SS), visual (VIS) and auditory (AUD) areas. Electrocorticogram (ECoG) was taken from these areas for 6 minutes and the relative spectral power of the frequency bands (delta, theta, alpha, beta1, beta2, gamma; standard human EEG bands as described in [11]) was determined. Then, sensory cortical evoked potentials (EPs) were recorded. Somatosensory stimulation was done with square electric pulses (3-4 V, 0.05 ms, 1, 2 and 10 Hz) delivered to the contralateral whisker pad of the rat. For visual stimulation, flashes of a high-luminance white LED (driven by 0.2 ms pulses at 1 Hz) were aimed directly at the rat's right eye. The acoustic stimuli were clicks (1 Hz, 40 dB) from a small earphone, guided into the animal's right ear via the hollow ear bar. Fifty stimuli of each modality per rat were applied, and the recorded EPs were averaged. After averaging, latency and duration of the evoked responses was measured manually (for details, see [22]). Finally, compound action potential was recorded form the rat's tail nerve. Two stimulating needles (delivering 4-5 V, 0.05 ms pulses at 1, 20 and 50 Hz) were inserted into the tail base; and another two, for recording, 50 mm distally. From the records, the conduction velocity of the nerve was calculated. The change of the latency of the somatosensory EP, and latency and amplitude of the nerve action potential, with increasing stimulation frequency was also investigated as an indicator of the action of the treatment on the state of the nervous system [22]. The complete electrophysiological recording and analysis was done by means of the Neurosys 1.11 software (Experimetria Ltd, Budapest, Hungary). Following electrophysiology, the rats were sacrificed by an overdose of urethane, dissected, and the relative organ weight of the lungs, liver, heart, kidneys, spleen, thymus and adrenals, related to the 1/100-th of body weight, was calculated. The results were tested for significance with one-way ANOVA and the post hoc analysis was done by Scheffe's test.

During the whole procedure, the principles of the Ethical Committee for the Protection of Animals in Research of the University were strictly followed.

3. RESULTS

Lead treatment caused significant retardation in the rats' body weight gain. The difference between group Con and W was moderate (Fig. 1).

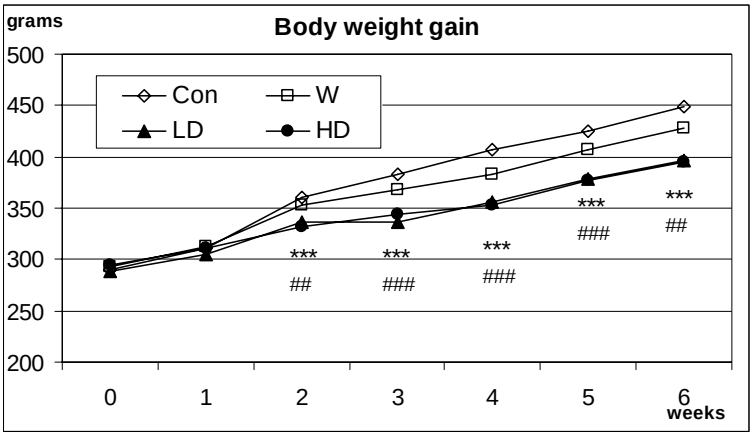


Figure 1. Body weight gain of the rat groups (see insert) during the 6 weeks of treatment. Group means, n=10.
*** : p<0.001 vs. Con; ##, ###: p<0.01, 0.001 vs. W.

The organ weights measured during final dissection indicted massive increase of the lungs and kidneys in both treated groups , and less severe effect on the brain and liver weight. In the HD groups, the lungs had a strongly emphysematous appearance.

Table 1. Relative organ weights after 6 weeks treatment.

	Treatment groups			
Organs	**Con**	**W**	**LD**	**HD**
Heart	0.255±0.018	0.264±0.020	0.282±0.032*	0.267±0.016
Spleen	0.188±0.025	0.176±0.026	0.199±0.034	0.187±0.021
Thymus	0.090±0.011	0.095±0.026	0.103±0.021	0.104±0.023
Adrenals	0.010±0.003	0.012±0.004	0.013±0.005	0.013±0.004
Liver	3.111±0.208	3.201±0.333	3.342±0.367	3.324±0.164*
Kidney	0.605±0.037	0.618±0.038	0.721±0.097**###	0.686±0.038**###
Lung	0.334±0.036	0.343±0.028	0.515±0.076**###	0.583±0.059**###
Brain	0.474±0.029	0.480±0.022	0.529±0.056*#	0.520±0.048*#

Mean±SD, n=10. Calculation: [organ weight]/[0.01 × body weight]
*,**,***: p<0.05, 0.01, 0.001 vs. Con; #, ##, ###: p<0.05, 0.01, 0.001 vs. W.

The general trend of the ECoG was activity decrease in the low and increase in the high frequency bands. As seen in Fig. 2, this trend was present in all three cortical areas but the change was significant only in the SS and VIS area and only in the HD group.

The latency of the SS EP was nearly identical in the Con and W groups, and noteworthy frequency-dependent increase was seen only with 10 Hz stimulation (Fig. 3). In the LD group, there was only minor latency increase but the frequency-dependent increase (10 vs. 1 Hz) significant. In the HD group, significant latency increase was seen and the frequency-dependent increase was more pronounced.

In line with the lengthened cortical latencies, the conduction velocity of the tail nerve was reduced in the treated groups (Fig. 4 left). Faster stimulation (50 and 20 ms period time instead of 1 s)was also applied to the tail, and the relative difference of the nerve action potential amplitude and latency, compared to the values obtained with 1 s period, was calculated. As seen in Fig. 4 (right), amplitude decrease on fast stimulation was present in both treated groups while latency increases only in the HD group.

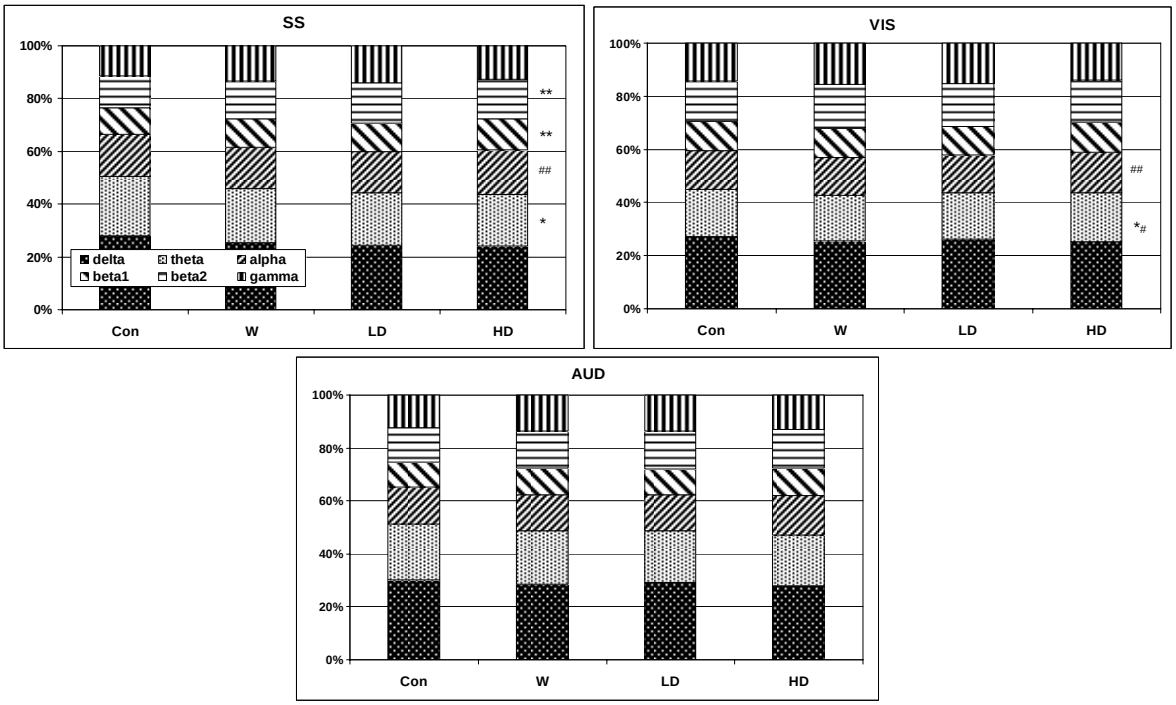


Figure 2. Band spectrum of the spontaneous cortical activity. Abscissa, groups; ordinate, relative ECoG power of the bands indicated in the insert (top left).
Group means, n=10. *,**: p<0.05, 0.01 vs. Con; #, ##: p<.05, 0.01 vs. W.

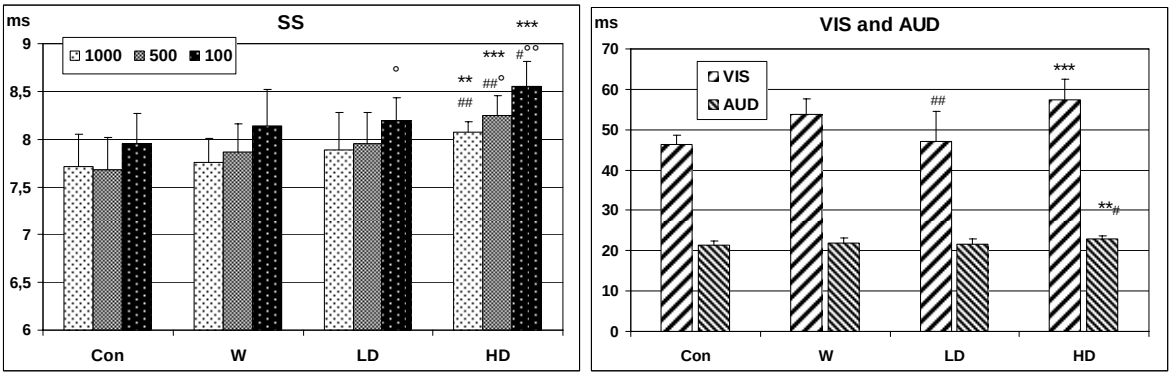


Figure 3. Left: latency of the somatosensory evoked potentials obtained with the stimulation period times given in the insert in ms (corresponding to 1, 2 and 10 Hz frequency).
Right: latency of the visual and auditory evoked potential.
Mean+SD, n=10. Significance marking as before

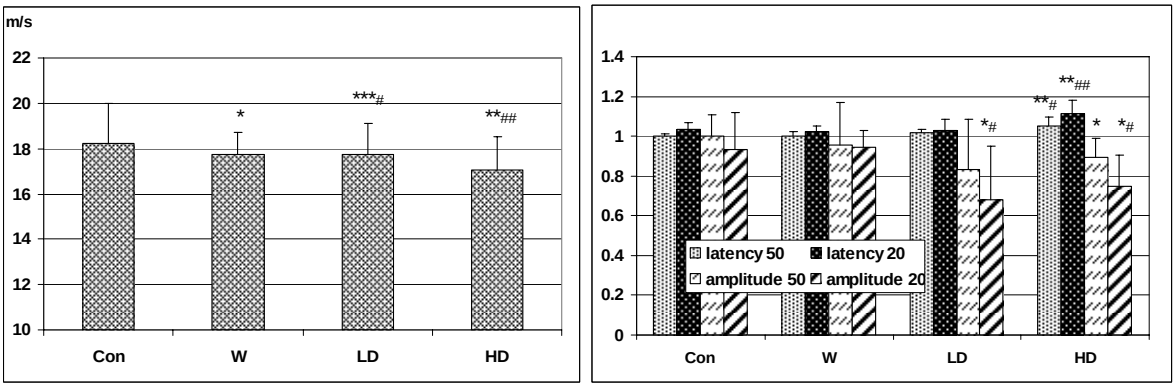


Figure 4. Left: conduction velocity of the tail nerve (ordinate, m/s) in the control and reated group.
Right: relative change of the latency and amplitude of the tail nerve action potential obtained with 50 and 20 ms period time (see insert).
Mean+SD, n=10. Significance marking as before

4. DISCUSSION

The electrophysiological changes in this study were similar to those observed earlier [17,18] in rats treated orally with a dissolved form of Pb. This indicates that, beyond causing lung inflammation and emphysema [16], the nanoparticulate metal was most probably absorbed from the airways and was present in the rats' brain. Intact nanoparticles have the capacity to cross the blood-brain barrier [20]. Or, after phagocytosis, the acidic local environment within the phagosomes [14] may set free Pb^{2+} ions [9] known to cross the blood-brain barrier [3] and even to damage it [8].

The nervous system effects of Pb^{2+} ions may be explained by its chemical similarity to Ca^{2+}. Stimulus-evoked release of ACh was reduced (but spontaneous release increased) by Pb^{2+} [26]. This possibly led to increased ascending cholinergic cortical activation and higher typical ECoG frequencies [13,17]. Reduced release of glutamate can, on the other hand, explain the slowed nerve pulse conduction and longer latencies [4] and decreased sensitivity of its cortical receptors [15]. Beyond that, Pb^{2+}, by acting on voltage-dependent Ca^{2+} and Ca^{2+}-activated K^{+}-channels [2,24], could slow down the propagation of action potential, resulting in the observed effects on the peripheral nerve and contributing to the increased latency of the cortical response.

REFERENCES

[1] Araki, S., Sato, H., Yokoyama, K., Murata, K. Subclinical neurophysiological effects of lead: A review on peripheral, central, and autonomic nervous system effects in lead workers. Am. J. Ind. Med. 37, 193-204 (2000)

[2] Audesirk, G., Audesirk, T. Effects of inorganic lead on voltage-sensitive calcium channels in N1E-115 neuroblastoma cells. NeuroToxicology 12, 519-528 (1991)

[3] Bradbury, MW, Deane, R. Permeability of the blood-brain barrier to lead. NeuroToxicology 14, 131-136 (1993)

[4] Braga, M.F.M., Pereira, E.F.R., Albuquerque, E.X. Nanomolar concentrations of lead inhibit glutamatergic and GABAergic transmission in hippocampal neurons. Brain Res. 826, 22-34 (1999)

[5] Chamberlain A., Heard C., Little M.J. Investigations into lead from motor vehicles. Phil. Trans. R. Soc. Lond. A 290, 557-589 (1978)

[6] Coffigny, H., Thoreux-Manlay, A., Pinon-Lataillade, G., Monchaux, G., Masse, R., Soufir, J.C. Effects of lead-poisoning of rats during pregnancy on the reproductive system and fertility of their offsprings. Hum. Exp. Toxicol. 13, 241-246 (1994)

[7] Fergusson, D.M., Horwood, J., and Lynskey, M.T. Early dentine lead levels and educational outcomes at 18 years. J. Child Psychol. Psychiatr. 38, 471-478 (1997)

[8] Goldstein, G.W., Asbury, A.K., Diamond, I. Pathogenesis of lead encephalopathy. Uptake of lead and reaction of brain capillaries. Arch. Neurol. 1, 382-389 (1974)

[9] Handy, R.D., von der Kammer, F., Lead, J.R., Hassellöv, M., Owen, R., Crane, M. The ecotoxicology and chemistry of manufactured nanoparticles. Ecotoxicology 17, 287-314 (2008)

[10] International Commission on Radiation Protection: Human respiratory tract model for radiological protection. A report of a task group of the ICRP. Annals of the ICRP, ICRP Publication 66, Pergamon Press, Oxford, 1994

[11] Kandel, E.R., and Schwartz, J. H. Principles of Neural Science. Elsevier, New York, 1985, pp. 643-644

[12] Kehoe, R.A. Studies of lead administration and elimination in adult volunteers under natural and experimentally induced conditions over extended periods of time. Food Chem. Toxicol. 25, 425-493 (1987)

[13] Kumar, M.V., Desiraju, T. EEG spectral power reduction and learning disability in rats exposed to lead through postnatal developing age. Ind. J. Phys. Pharm. 36, 15-20 (1992)

[14] Lundborg, M., Eklund, A., Lind, D.B., Camner, P. Dissolution of metals by human and rabbit alveolar macrophages. Br. J. Ind. Med. 42, 642-645 (1985)

[15] Ma, T., Chen, H., Lim, D.K., Hume, A.S., Ho, I.K. Effects of subacute lead exposure on [^{3}H] MK-801 binding in hippocampus and cerebral cortex in the adult rat. Brain Res. 760, 187-192 (1997)

[16] McNeilly, J.D., Heal, M.R., Beverland, I.J., Howe, A., Gibson, M.D., Hibbs, L.R., MacNee, W. Soluble transition metals cause the pro-inflammatory effects of welding fumes in vitro. Toxicol. Appl . Pharmacol. 196, 95-107 (2004).

[17] Nagymajtényi L., Schulz H., Papp A., Dési I. Behavioural and electrophysiological changes caused by subchronic lead exposure in rats. Centr. Eur. J. Occup. Environ. Med. 3, 195-209 (1997).
[18] Nagymajtényi, L. Dési, I., Schulz, H., Papp, A. Consequences of lead exposure of rats during pregnancy, lactation and postweaning. A combined behavioural and neurotoxicological study. Int. J. Environ. Health Res. 8, 121-135 (1998)
[19] Needleman, H.L., Gatsonis, C.A. Low-level lead exposure and the IQ of children. JAMA 263, 673-678 (1990).
[20] Oberdörster, G., Oberdörster, E., Oberdörster, J. Nanotoxicology: An Emerging discipline evolving from studies of ultrafine particles. Environ. Health Persp. 7, 823-839 (2005).
[21] Oka, Y., Mitsui, M., Kitahashi, T., Sakamoto, A., Kusuoka, O., Tsunoda, T., Mori, T., Tsutsumi, M., A reliable method for intratracheal instillation of materials to the entire lung in rats. J. Toxicol. Pathol. 19, 107-109 (2006)
[22] Papp, A., Pecze, L, Vezér, T. Dynamics of central and peripheral evoked electrical activity in the nervous system of rats exposed to xenobiotics. Centr. Eur. J. Occup. Envir. Med. 10, 52-59 (2004)
[23] Pinon-Lataillade, G., Thoreux-Manlay, A., Coffigny, H., Monchaux, G., Masse, R., Soufir, J.C. Effect of ingestion and inhalation of lead on the reproductive system and fertility of adult male rats and their progeny. Hum. Exp. Toxicol. 12, 165-172 (1993)
[24] Reuveney, E., Narahashi, T. Potent blocking action of lead on voltage activated calcium channels in human neuroblastoma cells SH-SY5Y. Brain Res. 545, 312-314 (1991)
[25] Strohl, K.P., Thomas, A. J., St.Jean, P., Schlanker, E.H., Koletsky, R.J., Schork, N.J. Ventilation and metabolism among rat strains." J. Appl. Physiol. 82, 317-323 (1997)
[26] Suszkiw, J., Toth, G., Murawsky, M., Cooper, G.P. Effects of Pb^{2+} and Cd^{2+} on acetylcholine release and Ca^{2+} movements in synaptosomes and subcellular fractions from rat brain and torpedo electric organ. Brain Res. 323, 31-46 (1984)
[27] Vezér, T., Schulz, H., Nagymajtényi, L. Memory effect of neurotoxic lead compunds in subacute animal experiments. Centr. Eur. J. Occup. Environ. Med. 6, 209-216 (2000)
[28] Yokoyama, K., Araki, S., Yamashita, k., Murata, K., Nomiyama, K., Nomiyama, H., Tao, Y.X., and Liu, S.J. Subclinical cerebellar anterior lobe, vestibulocerebellar and spinocerebellar afferent effects in young female lead workers in China: computerized posturography with sway frequency analysis and brainstem auditory evoked potentials. Ind. Health 40, 245-253 (2002)

ISIRR 2009 ROMANIA - HUNGARY - SERBIA

THE HEAVY METALS MONITORING IN CANNED VEGETABLES MIX

I. DAVID[1], F. BERBENTEA[1], M. ŞTEFANUŢ[2], L. GEORGESCU[1], G.BUJANCĂ[1], T.TRAŞCĂ[1], M.DANCI[1], Oana DANCI[1]

[1]U.S.A.M.V.B., Banat University of Agricultural Sciences and Veterinary Medicine,Faculty of Food Processing Technologies, Calea Aradului 199, Timisoara, ROMANIA
[2]INCEMC, National Research-Development Institute for Electrochemistry and Condensed Matter, str. Aurel Paunescu Podeanu 144, Timisoara, ROMANIA

Abstract

The paper proposes some possibilities for heavy metals detection in canned vegetables mix: Cr, Fe, Pb, Cd, Sn, Al, Zn, As . The heavy metals concentrations have been determinate by AA spectrometry and electrochemical methods: cyclic voltammetry. The monitoring of heavy metals in canned vegetables mix can help evaluate and improve the insufficiently developed technology.

Key words:

vegetables mix, heavy metals, AA spectroscopy, cyclic voltammetry

1. INTRODUCTION

Vegetables mix and similar products are widely used for taste enhancement of various food products. Apart from their taste properties they also have a high nutritive value due to the content of easily retainable sugars, vitamin C, carotenoids and mineral salts.

Vegetables mix is a produce conserved through decrease in humidity, thus preventing the evolution of microorganisms. Microorganisms require a certain minimum amount of water to develop; bacteria require 35%, yeasts 25% and molds only need 10%.

2. EXPERIMENTAL

2.1. Samples preparation

Vegetables mix products have been weighed and treated by concentrated nitric acid (67%, Merck, heavy metals free). Samples digestion has been achieved in a 1000W MWS-2 – Berghof type microwave oven using a three-step program: T_1=160°C, t_1=15 min., P_1=40-60% from total power, T_2=210°C, t_2=15 min., P_2=60-80%, T_3=210°C →100°C, t_3=15 min., P_3=0%.Thus resulted solutions have been completed with ultrapure water (RO System Operating Barnstead apparatus) to equal volumes in 25 ml calibrated flasks.

2.2. Methods of analysis

2.2.1. AA Spectrometry

The heavy metals content has been determinated by AA spectrometry (International Standard ISO 15586:2003) and cyclic voltametry (Koryta , 1993), i=f(E). AA spectrometry has been achieved with novAA 400 G type spectrometer - Analytik Jena - Germany, equipped with graphite furnace, WinAAS 3.17.0 software for evaluation, control and result presentation, a so-called cookbook, for every element, and a HS 55-1 hydride generator. Calibration curves have been plotted using standard solutions of metals in search.

2.2.2. Electrochemical Methods

Heavy metals such as Sn, Fe, Zn at the electrode surface are affcted by characteristic redox phenomena with can be used to determine their concentration. The voltammograms i=f(E) are obtained using PGZ 402 Voltalab, with VoltaMaster 4, version 7 software (User's manual, *Voltalab®*,2008). A 50 cm^3 BEC/EDI X51 V001 electrochemical cell, from Radiometer Copenhagen is part of the Voltalab system. Platinum electrodes (S_{work}=7.85 mm^2, S_{aux}=50 mm^2) and standard calomel electrode (SCE) with 0.1M HNO_3 support electrolyte have been used in experiments. Recording speed was 50 mV/min. at an apparatus sensitivity of 10 mA. Calibration curves for Fe and Sn have been plotted using metals standard solutions as I_{peak}=f(conc.).

3. RESULTS AND DISSCUTIONS

Vegetables mix products are obtained through processing of fully mature tomatoes, beans, onions, papricas. Vegetables concentrates are used in the food industry to enhance the taste and nutritive value of various products. There are three phases in the vegetables mixt production technology: obtaining the brute vegetables mixt, conditioning and packaging the product (HOTARARE nr.1197, 2002; ORDIN 1050**,** 2006**)**. When packaging into metallic cans the heavy metals content may exceed the safety limits, and in turn may be detrimental to public health. The two proposed analysis methods have the advantage of being fast and reliable (result accuracy). Five types of these products have been studied, both local and imported: four of them packaged in metallic cans and one in glass bottle, for reference.

The heavy metal concentrations in vegetables mixt determined by AA spectroscopy are presented in Table 1. High values are noted in the case of Fe (which although beneficial to the human body may become an energetic catalyst for some chemicalor biochemical processes), of Sn and of Al, especially in the Italian products.

Table 1. The heavy metal concentrations

No.	Sample	Concentration, ppm							
		Cr	Fe	Pb	Cd	Sn	Al	Zn	As
1.	Vegetables mix *Sultan* (Romanian product, Turkish licence, metalic can)	0.20	29.5	0.02	0.009	4.45	33.45	7.1	**
2.	Vegetables mix *Conserv frig* (Romanian product, metallic can)*	0.15	218.00	0.20	0.034	70.78	36.1	4.03	**
3.	Vegetable mix *Mib* (Romanian product, metallic can)	0.13	16.93	**	0.003	12.5	23.1	6.5	**
4.	Vegetable mix *Maxim's*, (Italian product, metallic can)*	0.18	41.31	1.9	0.109	14.8	80.2	9.0	**
5.	Vegetables mix *Buftea* (Romanian product, glass bottle)	0.26	27.61	0.16	0.017	8.24	48.56	8.79	**

* before the samples were taken the vegetables mix was homogenized at 1500 rpm with an IKA-LABORTECHNIK stirrer, with adjustable rotations and display unit observation
** under limit detection

It has been remarqued the high Cd concentration in *Maxim's* vegetables mix (Italian product).

For the determination of heavy metals by electrochemical methods, the first step was plotting the calibration curves. The methods used for Fe and Sn by means of cyclic voltametry i=f(E) are presented in Fig.1., Fig.2., Fig.3. and Fig.4.

The electrochemical method has only been applied for the higher concentration of metals Fe and Sn. Extracting Fe from the vegetables mixt products using this method has had no results. (Fig. 5.). Note that the Fe voltamogram is lower than the base line of the support electrolyte.

Sn, on the other hand, is present in the Italian vegetables mixt canned in high concentrations Fig.6 and Fig.7. (samples were taken from right next to where the can is welded, for all samples).

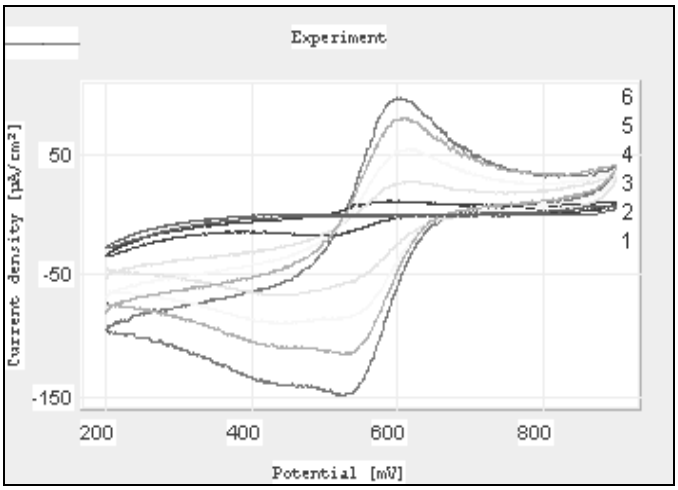


Fig.1. Cyclic voltammogrames for equilibrium $Fe^{3+} + e^- \rightarrow Fe^{2+}$. 1 – support electrolyte HNO3 0.1 M; 2 - c=25.64 mg/L; 3 - c=50.00 mg/L;4 - c=95.24 mg/L; 5 - c=136.36 mg/L; 6 - c=173.91 mg/L

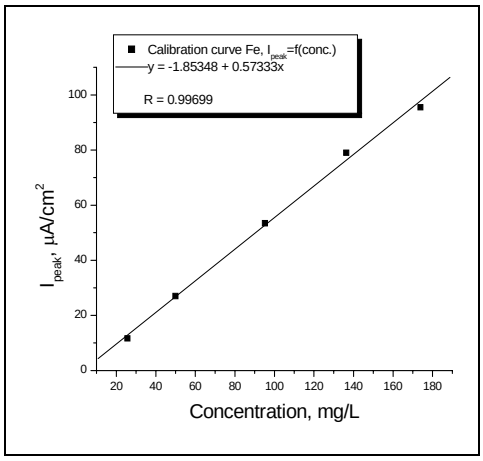


Fig.2. Calibration curve for iron concentration determination in canned vegetables mix, I_{peak}=f(conc.), E_{ESC} = 608 mV

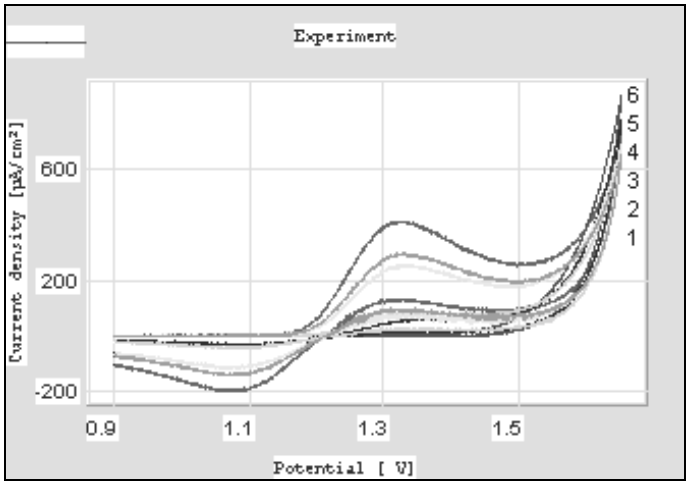


Fig.3. Cyclic voltammogrames for equilibrium $Sn^{4+} + 2e^- \rightarrow Sn^{2+}$. 1 – support electrolyte HNO3 0.1 M; 2 - c=6.8333 mg/L; 3 - c=13.5257 mg/L; 4 - c=20.0816 mg/L; 5 - c=26.5050 mg/L;6 – c=32.8000 mg/L

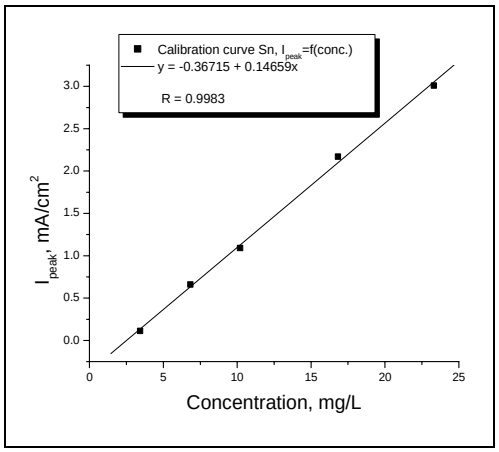


Fig.4. Calibration curve for tin concentration determination in canned vegetables mix, I_{peak}=f(conc.), E_{ESC} = 1.375 V

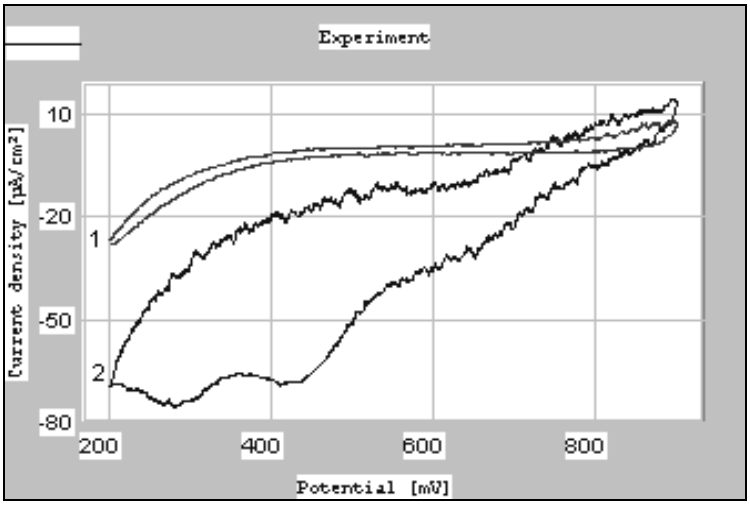


Fig.5. Fe determination in *Conserv frig* (vegetables mix)

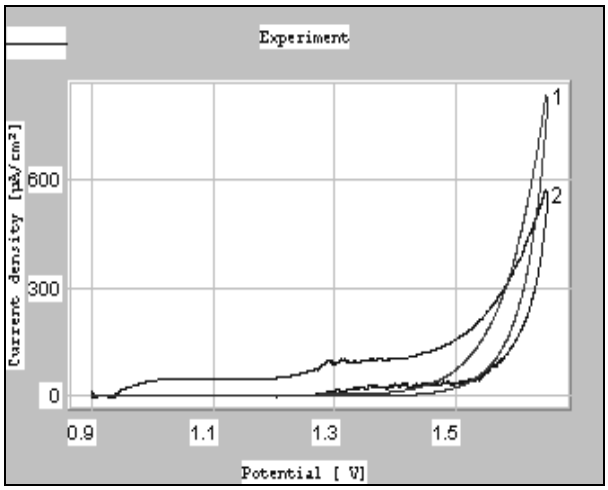


Fig.6. Sn determination in *Conserv frig* (vegetables mix), E_{ESC} = 1.375 V

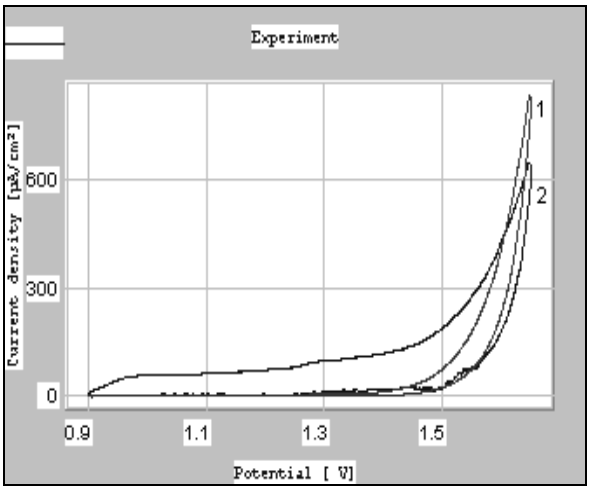


Fig.7. Sn determination in *Maxim's* (vegetables mix), E_{ESC} = 1.375 V

The values obtained using the electrochemical method are c = 3.60 ppm Sn for *Conserv frig* (I_{peak} = 0.1589 mA/cm²) and c = 3.40 ppm Sn for *Maxim's* (I_{peak} = 0.1367 mA/cm²). There are obvious errors in using this method due to all the metal ions which can influence the electrochemical behavior.

4. CONCLUSIONS

The environment pollution with heavy metals (Cr, Ni, Pb, Zn, Al, As, Cd, etc.) is due mainly to the activity of humans. Two heavy metals (Sn and Al) showed higher concentrations then legally admitted in canned vegetables mix. Concentration of heavy metals from the polluted environment in vegetables is influenced by different factors and stopped through several mechanisms. The monitoring of heavy metals in canned vegetables mix can help to evaluate and improve the insufficiently developed technology.

REFERENCES

[1] HOTARARE nr. 1197 /24 octombrie 2002 pentru aprobarea Normelor privind materialele si obiectele care vin in contact cu alimentele *(Romanian specific standard)*.
[2] * * * International Standard ISO 15586:2003 (E), Water quality – Determination of trace elements using atomic absorption spectrometry with graphite furnace.
[3] Koryta J., Dvorak J., Kavan L., „Principles of Electrochemistry", Wiley, Chichester, 1993, p.191.
[4] ORDIN 1050 /21.12.2006 privind aprobarea Normei sanitare veterinare si pentru siguranta alimentelor privind anumiti contaminanti din alimentele de origine animala si nonanimala *(Romanian specific standard)*.
[5] * * * User's manual, *Voltalab® system with VMA*, Radiometer analytical, 2008.

ISIRR 2009
ROMANIA - HUNGARY - SERBIA

EFFECTS OF SOME CALCIUM CHANNEL BLOCKER DERIVATIVES ON THE MULTIDRUG RESISTANCE OF CANCER CELLS

[1]Julianna SERLY, [2]Anamik SHAH, [3]Noboru MOTOHASHI,
[4]Masami KAWASE, [1]Joseph MOLNAR

[1]Department of Medical Microbiology and Immunobiology,
University of Szeged, HUNGARY
[2]Department of Chemistry, Saurashtra University, INDIA
[3]Meiji Pharmaceutical University, JAPAN
[4]Faculty of Pharmaceutical Sciences, Matsuyama University, JAPAN

ABSTRACT

4-Phenyl-3,4-dihydropyrimidin-2(1*H*)-ones were synthetised and evaluated for multidrug resistance reversal activity on a human *mdr-1* gene transfected mouse lymphoma cell line (L5178Y, PAR), and on a human ovary cancer cell line (A2780cis). The antiproliferative effects of the compounds **B1-B6** were evaluated, and the ID_{50} values were determined. Interactions between doxorubicine and some resistance modifiers were also studied in vitro.
The antiproliferative effects of the compounds were in the same concentration range for MDR lymphoma cells, and the ID_{50} values was almost doubled for human ovary cancer cells. A great difference was shown between the compounds on the effect of rhodamine 123 accumulation from ineffective (**B3, B4** and **B5**) to a very effective compound **B2**, FAR values were found between 2.7 and 25.3 at 4 and 40 µg/ml concentration. Two other compounds, **B1** and **B6**, were moderately effective (FAR = 1.5 to 9.5). Possible structure activity relationship will be discussed.

Keywords:
calcium channell blockers, MDR reversal, antiproliferative, combination

International Comparison of Blood Pressure and BMI Values in schoolchildren aged 11-16 years

Ákos Baráth[1], Krisztina Boda[2], Mária Tichy[1], Éva Károly[3], Sándor Túri[1]

[1]*Department of Pediatrics, University of Szeged, Hungary*
[2]*Department of Medical Informatics, University of Szeged, Hungary*
[3]*Gyula Hetényi County Hospital, Szolnok, Hungary*

Objective: The present study comprised part of a larger cross-sectional survey performed in Hungary in the period 2005-2006, which was designed to reveal the representative age-, gender- and height-specific percentile values for the SBP and the DBP in Hungarian children aged 11-16 years. A second aim was to determine the prevalence of overweight and obesity. Furthermore, we compared our findings with data on Italian, Israeli Arab, Ghanaian, Chinese and Turkish adolescents.

Methods: Analyses were performed on 14290 Hungarian children aged 11-16 years. All BP measurements were made with a validated, automated, digital device. Criteria recommended by international guidelines were used.

Results: The Hungarian, Italian and Israeli Arab adolescents have higher BP levels than their Ghanaian and Chinese counterparts. The Hungarian adolescents proved to be taller and heavier than their Turkish counterparts, and accordingly have higher SBP levels. The differences decreased with age. The prevalance of overweight and obesity among the Hungarian children was found to be 23.4% (3347 adolescents; International Obesity Task Force criteria).

Conclusions: Regional differences in morphometry and the genetic background, disparate eating habits and other cultural factors may account for differences in BP levels during childhood. Thus, each individual population needs to use its own normal standards to define a measured BP level in childhood. As the prevalence of overweight and obesity is increasing worldwide, it is important that countries carefully monitor the weight and BP status of their children and adolescents.

Microvascular reactivity in juvenile essential hypertension

Péter Monostori[1], Ákos Baráth [1], Ildikó Fazekas [1], Eszter Hódi [1], Adrienn Máté [1], Zsuzsanna Hracskó[2], Eszter Karg[1], Ilona S. Varga[2], Viktória Sümegi[1], Balázs Gellén [1], Csaba Bereczki[1], Sándor Túri[1]

[1] *Department of Paediatrics, University of Szeged, Szeged, Hungary*

[2] *Department of Biochemistry and Molecular Biology, University of Szeged, Szeged, Hungary*

Examination of juvenile essential hypertension offers a presumably closer approach to the pathogenesis of hypertension, due to smaller impact of cardiovascular risk factors at this age. Our aim was to study the forearm microvascular reactivity of hypertensive adolescents, either lean or overweight.

Nineteen overweight hypertensive (OH), 10 lean hypertensive (LH) adolescent patients and 19 healthy controls were enrolled. Twelve young adult patients on haemodialysis (HD) served as positive controls. Blood samples were drawn for the enzymatic determination of concentrations of oxidized and reduced glutathione (GSSG, GSH). Microvascular reactivity on two sites of the volar side of the forearm was evaluated by means of laser Doppler flowmetry (LDF). An iontophoresis sequence, consisting of three consecutive, increasing doses of either acetylcholine (Ach) or sodium nitroprusside (SNP), and local heating to 44°C (maximal vasodilation) were performed.

Microvascular reactivity was moderately decreased in the two hypertensive groups, and markedly attenuated in the HD patients, as compared with controls. The whole blood ratios GSSG/GSH were significantly higher in all patient groups than in controls, the largest values were found in the HD group.

In summary, a modest attenuation of microvascular reactivity was observed in juvenile hypertensives; its degree was similar in the OH and LH adolescents. This may be related to the increased oxidative stress, as shown by the elevated ratios GSSG/GSH.

ISIRR 2009
ROMANIA - HUNGARY - SERBIA

QUALITY CHANGES IN REGIONAL FOOD PRODUCTS AS A CONSEQUENCE OF CONSERVATION TREATMENT

T. PÁLI[a], J. KISPÉTER[b], M. FEKETE[b], L. FEHÉR[b],
E. FODOR[a], L. KOVÁCS[c], ZS. LÁSZLÓ[b],
K. BAJÚSZ-KABÓK[b], G. SZABÓ[b]

[a]Institute of Biophysics, Biological Research Centre, Szeged, HUNGARY
[b]College of Food Industry, University of Szeged, HUNGARY
[c]Droginvest Kft., Szeged, HUNGARY

ABSTRACT

The changes in South Hungarian spice paprika powder induced by ionizing radiation, saturated steam (SS) and their combination were studied as a function of the absorbed radiation dose and the storage time. The SS treatment lead to a decrease in color content (lightening) after 12 weeks of storage, together with the persistence of free radicals and viscosity changes for a longer period.

The changes in microbiology, colour composition and free radical content induced by ionizing radiation – a food preservation treatment – were studied in dry onion samples as a function of the absorbed dose. Typical onion species from South Hungary (Makó), South Serbia and Poland, with variable quality and colour composition, showed markedly different responses to ionizing radiation.

The results suggest that ionizing radiation is a more advantageous method as concerns preservation of the quality of spice paprika. In addition, the measurement of the above characteristics is a useful tool to determine the critical dose of ionizing radiation to achieve the desired microbiological purity and to predict quality changes.

EFFECT OF CHLOROPHYLL *A* AND *B* ON MULTIDRUG RESISTANCE OF CANCER CELLS

[1]SZABO M., [2] TANACS L., [3]MOLNÁR J., [4]OCSOVSZKI I.

[1]Department of Plant Biology,
[2]Institute of Plant Sciences and Environmental Protection,
[3]Institute of Medical Microbiology and Immunobiology,
[4]Institute of Biochemistry University of Szeged, Szeged, HUNGARY

ABSTRACT

Various plant compounds have been identified as potential anticancer agents or modifiers of the multidrug resistance. Among these compounds are different carotenoids, and terpenoids. The effect of chlorophyll compounds isolated from the leaves of bean plants on MDR was studied.

The effect of chlorophyll *a* and *b* was studied on the drug accumulation in human MDR1 gene transfected mouse lymphoma cells. Chlorophyll *a* and *b* had similar dose dependent effect on cell membrane structure without altering the cell size measured by flow cytometry.

Chlorophyll *b* was able to elevate moderately Rhodamine 123 accumulation of tumor cells. The combination of chlorophyl *b* and capsorubin had a remarkable increase in the inhibition of Pgp 170 while the chlorophyll *a* reduced the effect of capsorubine.

MDR reversal effect of chorophyll *b* can be explained by energetically favorable electron charge transfer complex formation with the Pgp170. The energy gradient is in the optimum range from carotenoids to chlorophyll *b*, but low binding energy of chlorophyll *a* does not modify the functionally active conformation of the Pgp 170 membrane protein, In checkerboard experiment the combination of doxorubicine and chlorophyll *b* resulted in a synergistic interaction on inhibition of proliferation of MDR tumor cells in vitro.

IN VITRO SUSCEPTIBILITY OF DIFFERENT ZYGOMYCETES TO COMBINATIONS OF SURAMIN AND FLUVASTATIN

László GALGÓCZY, Máté VIRÁGH,
Tamás PAPP, Csaba VÁGVÖLGYI

[1]University of Szeged, Faculty of Sciences and Informatics,
Department of Microbiology,
H-6726 Szeged, Közép fasor 52., HUNGARY

Abstract

The number of zygomycotic infections (caused by member of Zygomycetes) has increased over the past years. Most of the antifungal agents are ineffective against these fungi; furthermore, treatments have serious side effects and could not be applied without a damage of the host. Therefore, there is a need to find novel substances having antifungal activity. Suramin is known as an agent for treatment of parasitic infections and an antitumor medicine. Fluvastatin is a fully synthetic compound, which is used as cholesterol lowering drug in human therapy.

The *in vitro* antifungal activity of suramin and its combinations with fluvastatin were investigated in this study against 15 Zygomycetes isolates representing 8 clinically important genera (*Absidia*, *Micromucor*, *Mortierella*, *Mucor*, *Rhizomucor*, *Rhizopus*, *Saksenaea* and *Syncephalastrum*). The growth inhibitory effects of various concentrations of fluvastatin, in the presence of suramin (100 μg ml^{-1}) were studied. The investigated compounds acted synergistically and additively on the growth when a strain was resistant to suramin and sensitive to fluvastatin, at the same time antagonistic interactions were detected when strains were sensitive to both agents. In these cases, the growth inhibitory effect of suramin was dominant.

This research was supported by RET-08/2005 (OMFB-00846/2005). T. Papp is a grant holder of the J. Bolyai Research Scholarship.

NEWBORN SCREENING FOR METABOLIC DISORDERS WITH TANDEM MASS SPECTROMETRY IN METABOLIC SCREENING CENTER OF SZEGED

F. Papp, E. Karg, Gy. Wittmann, M. Török, P. Monostori, Á. Baráth, S. Túri

University of Szeged, Albert Szent-Györgyi Clinical Center, Faculty of Medicine, Department of Pediatrics and Child Health Center, Hungary

Although individually rare, inborn errors of metabolism represent a potentially preventable cause of death and disability.

In Hungary, expanded newborn screening for rare inherited metabolic disorders by using tandem mass spectrometry (MS/MS) was introduced in October of 2007. Previously, four metabolic diseases were screened with different diagnostic methods: phenylketonuria (from 1975), galactosaemia (1975), congenital hypothyroidism (1985) and biotinidase deficiency (1990). MS/MS is adapted to quantitative measurement of amino acids and acyl-carnitines from dried blood spot and allows newborn screening for numerous biochemical genetic disorders with abnormal amino acid or acyl-carnitine profile, including aminoacidopathies, urea cycle defects, organic acidaemias, abnormalities of fatty acid oxidation and carnitine metabolism. Together with the formerly assayed diseases, now 26 inborn errors of metabolism are screened in all of Hungarian newborns, 23 of them with MS/MS. In the first year of expanded screening programme, approximately 45.000 newborn infants were investigated from the eastern part of Hungary. 16 patients with different metabolic disorders (phenylketonuria, n=5; 3-methylcrotonyl-CoA carboxylase deficiency, n=4; short- chain acyl-CoA dehydrogenase deficiency, n=3; medium-chain acyl-CoA dehydrogenase deficiency, n=2; propionic acidaemia, n=1; isovaleric acidaemia, n=1) were diagnosed by MS/MS and started to follow up and treat in Metabolic Screening Center of Szeged. Clinical characteristics of screened cases will be discussed in detail.

ISIRR 2009
ROMANIA - HUNGARY - SERBIA

MIGRAINE HEADACHE AND COMORBID CONDITIONS IN WOMEN: RETROSPECTIVE ANALYSIS

Délia SZOK, Éva PÁLINKÁS, Zsófia MAJLÁTH,
Anita KISS, Aurélia UNGUREÁN, Árpád PÁRDUTZ,
János TAJTI, László VÉCSEI

Department of Neurology, University of Szeged, Szeged, HUNGARY

ABSTRACT

Migraine is a frequent primary headache, especially in women. The migraine prevalence is between 6-18% and the gender ratio in women and men is 3:1. Two main forms of migraine type headache are migraine with aura and migraine without aura. Migraine without aura is more common. There are several comorbid diseases with migraine, such as ischemic stroke, depression, epilepsy, cardiovascular disorders and patent foramen ovale. Comorbidity means the occurance of two diseases in one individual beyond chance.

Self-made detailed (24 questions contained) questionnaire was used for retrospective analysis of migraine patients data. First part of the questions were applied to headache features (localisation, intensity, frequency, accompanying symptoms, aura symptoms, etc.), second part of the questions are about comorbid state, familiar medical history, hormonal profile in women and medication therapy.

Among our migraine patients (n=431) the major comorbid factor was depression and anxiety. There are cerebrovascular and cardiovascular patients between migraineurs, too. We have found that epilepsy and patent foramen ovale are quite rare in our patient group.

According to other international data from both retrospective and prospective studies, our results seem to be similar.

References

Diener HC, Küper M, Kurth T. Migraine-associated risks and comorbidity. J Neurol 2008;255:1290-1301.

IMPLANT SUPPORTED OVERDENTURES

CAMPEANU Cornel Radu

SC Campeanu Medcom SRL, ROMANIA

Abstract:

For decades, natural teeth have been retained in the mouths of debilitated patients to support/retain overdentures and preserve bone. In a similar manner, root form implants have also been successfully used to enhance the support, retention and stability of overdentures.

Keywords:

Overdenture, edentulous, retention

1. THE DEVELOPMENT OF THE OVERDENTURE

The loss of the remaining teeth can be an emotional experience for many. The loss of teeth is associated with ageing and this can be a depressing factor for many. One should not underestimate the emotions related to the oral area and their effect on the patient's body image.

Preserving natural teeth or their roots (for example the two canines on an arch) should be considered as often as possible because of the advantages of this treatment choice:

1. Psychological benefits to the patient;
2. Preservation of the edentulous ridge;
3. Tactile discrimination;
4. Improved stability and retention of the denture.

In situations where extracting the remaining teeth is the only option left, patients may wear conventional dentures which give them a feeling of "floating plastic" in their mouth and a much lowered chewing capacity or choose implant supported restorations in order to restore their functional and esthetic status.

2. AVAILABLE BONE AND ANATOMICAL LIMITATIONS

Bone loss is a major issue regarding the treatment choice of edentulous patients. Available bone describes the amount of bone available in the area considered for implantation. It is measured in height, width, length and angulation.

The height of the available bone is measured from the bone crest to the closest anatomical landmark. As a general guideline, 2 mm is maintained between the implant and any adjacent landmark. In the posterior regions, the opposing landmarks are the maxillary sinus and the mandibular canal. The anterior regions are limited by the maxillary nares or the inferior border of the mandible. The problem in implant dentistry is that the posterior regions impose the greatest limits for placing dental implants. In these regions, implants will be shorter or none at all, but forces in the posterior areas are greater, since this is where mastication is done and where natural teeth have two or three roots. By not placing dental implants in this area, the clinician is often in the situation of choosing an overdenture instead of a fixed prosthesis.

The width of the bone is measured between the facial and lingual crests at the site where the implant will be placed. A 3.75 mm diameter implant requires a bone width of at least 5 mm in order to obtain a predictable result.

The length of the bone is limited by the adjacent teeth or implants. For bone 5 mm wide or more, the minimum mesiodistal length for each implant is 5 mm. Lower bone widths require higher lengths for the available bone.

Bone angulation is another determinant for alveolar bone. It should be aligned with the oclusal forces and parallel to the clinical axis of the clinical crown of the prosthodonthic restoration.

3. SUCCESS, FAILURE AND COMPLICATION DATA

Implant overdentures are associated with more complications than any other type of implant prosthesis. However, the complications do not negate the benefits these prostheses provide for patients. Implant overdentures have been more successful in the mandible than maxilla.

4. IMPLANT LOSS

Several clinical studies provide data regarding implant loss in the maxilla. The mean loss of implants was found to be around 21%.

There are clinical studies that evaluate mandibular implant loss associated with overdentures. The mean loss of implants was found to be around 5%.

Studies also provide data regarding the time (preprosthetic or postprosthetic) when the implants were lost. Sixty percent of the implants were lost preprosthetically and forty percent were lost postprosthetically.

5. DESIGN PRINCIPLES

Number of Implants

The number of implants used with overdentures has included one midline implant, two individual implants, two implants connected by a bar, and 3 or more implants connected by a bar. Placing several implants in the maxilla (because of the higher maxillary implant loss data) that are connected by bars permits the prosthesis to continue functioning should there be loss of an implant. It has been proposed that maxillary overdentures be supported by at least 4 implants, evenly distributed around the arch and connected by a bar.

In the mandible, the use of 4 implants and a bar was compared with 2 implants and a bar [1]. The authors evaluated plaque, calculus, and bleeding scores, probing depths, gingival recession, implant percussion, and made standardized radiographs. No differences were noted in the clinical or radiographic parameters and the authors suggest that 2 implants may be sufficient in the mandible. However, they did theorize that 4 implants might be beneficial for patients with sore, painful mandibular ridges since more force would be supported by the implants and bar rather than the edentulous mucosa.

Individual versus connected (splinted) implants

Clinical studies have compared individual implants with implants connected by a bar. A study [2] of photoelastic stress patterns indicated that individual implants with ball/o-ring attachments transferred less stress to the implants than the design that used 2 implants connected by a bar. There were no biologic differences between the 2 designs but greater prosthesis retention was attained when the implants were connected by a bar.

Since no clear biologic advantages have been associated with the number of implants used in the mandible (individual or connected), the numerical decision should be based on retention requirements. For many patients, two individual implants with associated retentive mechanisms provide good patient satisfaction and the treatment is less costly than a bar overdenture. For patients where retention is a primary requirement (as evidenced by active oral musculature and functionally demanding eating expectations), the use of 3, 4, or more implants and interconnecting bars with multiple retentive mechanisms is recommended.

Location of the Implants

The implants should be located so they are contained within the normal form of the denture base. Their form and location should ideally not produce substantial changes in the dimensions of the denture base. The canine areas often serve as appropriate locations for

implants. It is important to determine the location of the prosthetic teeth and the size and form of the denture base prior to implant placement. These characteristics are identified through development of a wax trial denture using conventional complete denture procedures. Implants that support/retain overdentures are commonly located in the anterior area of the mouth and they should be centered beneath the prosthetic teeth or slightly lingual to the center of the prosthetic teeth. When the implants are located anterior to the teeth or substantially posterior to the teeth, the denture base has to be enlarged to encompass the implant and retentive mechanism. The enlarged base dimensions prolong the time it takes for a patient to adapt to the new prosthesis and can make the adaptation challenging.

There is another negative aspect of placing implants too far facially or lingually. With malaligned implants, efforts are commonly made to reduce the amount of resin base overcontouring and this process frequently leaves only thin areas of resin over the retentive mechanisms. The thin resin is more prone to fracture. When implants are placed posteriorly, they should be centered beneath the prosthetic teeth.

A 5-year study [3] of 90 mandibular overdenture patients measured the parallelism of the virtual implant axis or bar with the transverse horizontal axis (hinge axis). There was parallelism in 7 patients. The study failed to show any highly significant advantages of achieving parallelism between the implant axis and the opening-closing axis of the mandible.

Implant Alignment

Implants that are parallel to each other or have their long axes nearly aligned with each other facilitate the prosthodontic phase of treatment by allowing the use of standardized components. When individual implants will be used with o-ring retention, malalignment can make prosthesis placement more difficult and the o-rings are pinched more often during placement and removal, producing o-ring wear and earlier loss of retention.

The master casts of 41 patients who had received 2 implants and ball abutment/o-ring overdentures were measured [4] to determine the effect of implant alignment on the number of adjustments/repairs. When a perpendicular relationship of the implant to the residual ridges was used as a reference angulation, implants that were inclined about 6 degrees to the facial or lingual were associated with a significantly higher number of repairs.

When an implant is placed substantially out of alignment with other sources of retention, the fabrication of custom components may be necessary. To facilitate axial loading of the implants, it has been recommended that implants be aligned so their long axes are perpendicular to the occlusal plane.

6. IMPLANT COMPONENT/RETENTIVE MECHANISM HEIGHT ABOVE THE SOFT TISSUE

After development of the wax trial denture, it is important to assess base dimensions to determine the amount of space available for implant components and retentive devices. The height of implant components and retentive mechanisms should be reduced as much as possible since they weaken the prosthesis base. However, the height should be sufficient to allow bars to be fabricated in such a manner that some space is present beneath the bar. It is recommended that a 1-2 millimeter space be present between the underside of metal bars and the edentulous ridge mucosa. It is felt that the potential for adverse soft tissue responses is related to minimal spaces underneath a bar. It has also been suggested in one publication that adverse responses under bars occur more often when unattached mucosa is present. In contrast, a study of 62 patients [5] found that attached mucosa was not a prerequisite for the maintenance of healthy function.

Peri-implant soft tissue complications were more frequently encountered with maxillary implant overdentures and it has been suggested that the reason may be related to the reduced vertical space available in the maxilla. Mandibular resorption frequently creates more vertical space than occurs in the maxilla causing retentive bars to be placed closer to the soft tissue in the maxilla. It has been stated that good oral hygiene is the main factor in preventing adverse soft tissue responses.

A 5-year longitudinal study [3] investigated the effect of the retentive mechanism on periimplant parameters (plaque index, bleeding index, probing depth, and clinical probing

attachment level). The retentive devices included round bars (both straight and curved to follow the arch form), U-shaped bars with and without distal extensions, and individual ball abutments. The authors concluded that the type of retentive mechanism appears to have little or no influence on peri-implant parameters. Some peri-implant soft tissue complications are severe enough to require surgery.

Retentive mechanisms vary in incisocervical and faciolingual dimensions. For example, ball attachments for o-rings can be as small as 2 millimeters in diameter or as large as 3.5 millimeters in diameter. The height of ball attachments (including the height of the ball abutment and the overlying o-ring is about 5-6 millimeters. The same height is occupied by ball abutments and metal caps that snap over the ball. Bars and clips are frequently 2-4 millimeters occlusocervically and 2-3 millimeters faciolingually. Bars that accept snap type attachments (Ceka) are about 1.5 millimeters in height with a faciolingual dimension of 2-4 millimeters. The overlying attachment that snaps into the recess in the bar is 1.5 to 2.5 millimeters in height for a total of up to 5 millimeters.

It is advantageous to have 2 or more millimeters of resin thickness surrounding the retentive mechanism when possible. Available base thickness will help determine the type of mechanism that can be used.

In summary, all retentive mechanisms require an occlusocervical space of about 8 millimeters (including retentive mechanism, overlying base material, and space under bars). When there is not sufficient space available, a change in the type of retentive mechanism may be necessary or the base may have to be thickened. For diagnostic purposes, the wax trial denture can be duplicated in clear acrylic resin and used in conjunction with a wax pattern of the proposed retentive mechanism to assess available space.

REFERENCES:

[1] Batenburg RHK, Raghoebar GM, Van Oort RP, Heijdenrijk K, Boering G. Mandibular overdentures supported by two or four endosteal implants. Int J OralMaxillofac Surg 1998;
[2] Kenney R, Richards MW. Photoelastic stress patterns produced by implant-retained overdentures. J Prosthet Dent 1998;
[3] Oetterli M, Kiener P, Mericske-Stern R. A longitudinal study on mandibular implant supporting an overdenture: The influence of retention mechanism and anatomic-prosthetic variables on periimplant parameters. Int J Prosthodont 2001;
[4] Walton JN, Huizinga SC, Peck CC. Implant angulation: A measurement technique, implant overdenture maintenance, and the influence of surgical experience. Int J Prosthodont 2001;
[5] Mericske-Stern R. Clinical evaluation of overdenture restorations supported by osseointegrated titanium implants: a retrospective study. Int J Oral Maxillofac Implants 1990;

RETENTION FOR IMPLANT SUPPORTED OVERDENTURES

CAMPEANU Cornel Radu

SC Campeanu Medcom SRL, ROMANIA

Abstract

When placed in the mouth, a removable prosthesis is subjected to a number of forces which tend to withdrawal it along its axis of insertion. Retention is the force that opposes this tendency. In ideal situations, overdentures should have good stability and border seal to provide retention. Unfortunately, in practice, the ideal situation does not always apply. Anatomical variations and tissue loss related to aging dictate the type of overdenture to be used. Retention systems have been devised in order to achieve a better prosthetic result.

Keywords

Overdenture, attachment, friction

1. RETENTIVE MECHANISMS

There are several types of retentive mechanisms available, including the ball/o-ring, bar(s)/clip(s), magnet, and other types of mechanical attachments.

The choice has largely been determined by practitioner preference with bars/clips being one of the mechanisms frequently selected to support/retain overdentures. When bars are used, it has been proposed that the bar be fabricated so it is parallel to the plane of occlusion [1].

Ideally, the retentive mechanism should be positioned so it cannot be seen through the visible portion of the denture base, does not interfere with proper positioning of prosthetic teeth, and does not excessively enlarge the denture base.

2. BAR ATTACHMENTS

Bar attachments (Fig. 1, Fig. 2) have been used for most of the twentieth century They can be divided into two groups, those allowing slight movement between the components, the bar joins and the comparatively rigid bar units. Bar attachments lend themselves to implant prosthodontics. The retention characteristics are favourable and they are robust and effective retainers.

This type of rehabilitation usually requires a minimum number of two implants. In the case of mandibular overdentures, the bar and clip retention system is frequently used. This system ensures the fixation and support of the prosthesis in the anterior area, but also allows protection from oclusal forces when chewing forces are applied on the posterior part of the prosthesis.

The bar, as a mesostructure is cemented or screw retained to the implants in order to join them and provide retention to the overdenture.

The Dolder bar or the round bars are used mostly in cases where implants are interforaminal because they allow the prosthesis to rotate around the axis of the bar.

Fig. 1

Fig. 2

3. BAR JOINTS

Bar joints allow some movement between the two components. They can be subdivided into two types:

- Single sleeve bar joints:

The Dolder bar joint is an excellent example of this type of attachment. This well-tried bar is produced from wrought wire, pear shaped in cross-section and running just in contact with the oral mucosa between the abutments. An open-sided sleeve is built into the impression surface of the denture and engages the bar when the denture is inserted. A spacer is provided with this bar joint to allow a degree of movemet potential.

- Multiple sleeve bar joints

The retaining sleeves are relatively short. This allows the bar to follow the curvature of the ridge as well as to be adapted to its vertical contours. This type of approach has proved to be very versatile and has become very popular with implant supported overdentures.

Although friction between the sleeves and the bars may be improved by activating the sleeve, there are many possibilities of combining this system with others like Ceka attachments, Presso-matic, Isoclip and 3-D-O-Ring.

4. STUD ATTACHMENTS AND MAGNETS

Stud shaped attachments have served as overdenture abutments for several decades. Most are straight-forward to use and possess favourable retention characteristics. Nowadays, they have applications to both root and implant supported prostheses.

For the purpose of description, stud attachments are divided into two groups:

- Extraradicular, in which the male element projects from the root surface of the preparation or implant.
- Intraradicular, in which the male element forms part of the denture base and engages a specially produced depression within the implant.

In selecting an attachment, it should be appreciated that space must exist for these units to be surrounded by a reasonable thickness of acrylic resin, otherwise the denture will be weakened.

Examples of stud attachments:

The Ceka system (Fig3, Fig.4):

The basic idea is simple: a spring pin which snaps exactly into a conical female. Together, they make up the Ceka Attachment. It was developed 35 years ago as an esthetic alternative to the traditional clasp, and ensures stable retention. Once the spring pin "clicks" into the female, the patient knows that the prosthesis is properly seated.

Fig.3

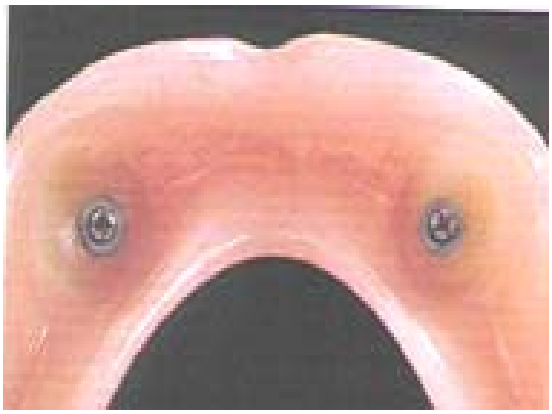


Fig. 4

Overdenture using O-Ring:

The o-ring abutment is fabricated from titanium alloy and available in variable cuff heights that incorporates a coronal spherical geometry which snaps into a rubber o-ring in the denture or partial denture acrylic base.

The Rothermann system:

It consists of a short stud with a retaining groove. Retention provided by a C-shaped ring designed so that the free ends of the clip engage the deepest portion of the retaining groove. The stud comes with a central core of solder for easy attachment to the coping

The Gerber system:

Stud type, matrix, patrix, resilient and non-resilient designs

Magnets:

Magnetic retention systems have been used in prosthodontics for some 60 years. The early types of magnets could not be reduced in size in order to allow their application for overdentures. The introduction of rare earth alloys with a high field strength and an intrinsic coercivity many times that of earlier alloys allowed the production of magnets that were not much larger than stud retainers. Space was always a problem with magnet retainers and this lead to several designs in order to fit all the necessary components. The magnets are placed in the denture and the flat keeper on the abutment root. A disadvantage of this system is the corrosion of the ferromagnetic alloys.

5. TELESCOPIC OVERDENTURES

The implant abutments are covered with occlusally converging primary cast copings. Support and frictional retention for the prosthesis is provided either by secondary cast copings fitting over the primary copings and incorporated as an integral part of the denture base.

The retention and stability of the overdenture is achieved trough the friction between the primary coping and the secondary coping in the overdenture.

6. BASE REINFORCEMENT

When the denture base will be thin or there are heavy occlusal forces present, it may be prudent to reinforce the denture base with a metal mesh/framework incorporated into the denture base or use a metal base.

Evaluating prosthetic tooth wear on an existing prosthesis provides an indication of the magnitude of forces present. When aggressive wear facets are noted on the prosthetic teeth of an existing denture, a hostile environment is likely to be present and the use of reinforcement may be advisable.

It is also important to remember that patients who have implants can place greater occlusal force on the prosthesis than they could with their conventional complete denture. However, the maximal occlusal force applied by patients with mandibular implant

overdentures was found to be less than the force developed by patients with teeth and patients who have fixed complete dentures.

7. COMPARISON OF RETENTIVE MECHANISMS

When bars are used, a casting is required which increases cost and complexity. Bars have been found to provide greater retention than balls/o-rings which may be important with patients exhibiting high functional activity and the need for maximal retention. One study [2] indicated that o-rings provided significantly better retention and stability than magnets.

Bars and associated retentive devices require more space within the denture base than do o-rings. When implants will be used separately (not connected), the ball/o-ring mechanism or metal cap/stud type of design has frequently been used.

All mechanisms are subject to retention deterioration over time and the need for regular adjustment/replacement.

REFERENCES:

[1] Misch CE. Contemporary Implant Dentistry (ed 2). St Louis, MO, Mosby, 1999.

[2] Burns DR, Under JW, Elswick Jr. RK, Beck DA. Prospective clinical evaluation of mandibular implant overdentures: Part I – retention, stability, and tissue response. J Prosthet Dent 1995.

QUO VADIS, SEXUALITY?

Daniela BOTAS

Clinician Psychologist of Emergency Hospital from Deva, Member of Association for Medicine of Sexuality from Romania, European Association of Urology Affiliated Member
Masterand in Sexology –University of Medicine and Pharmacy from Cluj-Napoca, ROMANIA

ABSTRACT

Noticing the profound everyday changes in social structure and dynamics, changes that ask for an individual's adaptation and integration, we come to ask ourselves: "Where is sexuality repositioning itself, on which step of life's everyday ladder?"

The peaceful and pleasant silence is suddenly disturbed by an irritating noise that does not seem to quiet down. Another day begins; a day of work, running around, stress, contradictory conversations, sensational news that relate troubled times are approaching. It is what Fanus Neagu called "the thirst for others' misery". We continue on with our children returning from school with teacher complaints and then, when we finally await the time to close the blinds for the night, our television sets draw us in and keep us glued watching channels that portray immorality, catastrophy and that encourage the most inhumane behavior possible.

Finally, you gaze towards your wife and watch her sleep; the hour is late, what have you forgotten? It has been a very busy day, another one inevitably follows. Something's missing; but what? You fall asleep asking yourself: "What else?" and your unconscious pampers you with nervous discharges, offering you hallucinogenic moments of eroticism.

In situations as described above, we wonder: "Where does sexuality stand, on which step or level of our everyday life?" Green said: "Make everyday as complete as possible". But is it possible?

Birthrates worldwide have plummeted, the average age at which young folk decide to build a family has increased, pushing the time of conception towards an age at which having a second child is a physiological and "logistic" impossibility.

We face a daily change in social structure and dynamics, a change that requires adaptation and integration skills for all individuals, a change that is simply the depreciation of traditional values and a depersonalization of the individual that manifests itself in new attitudes, mentalities and behavior.

This "new social order" also deals directly with sexual and erotic concepts and behaviors.

The brief description from our introduction, which relates to a couple's normal day, prompts us to speak about the psychological sexuality of the couple and its ups and downs. We may also say that the crises a couple faces are comparable –in a microscopic way of speaking- to the global crisis in this matter.

In our contemporary society, the couple is based more and more on interest rather than love. Do you think that the global crisis is affecting an individual's sexuality? Is that individual interested in sexuality or is he/she more focused on their survival, along with their family's well-being?

Sexuality is a fundamental part of human behavior. Practice has proven that without taking into consideration the biological or mental health of an individual or their professional training, they are not satisfied on an intimate level unless they have a normal and regular sexual function, the negation of which translates into a feeling of frustration that reflects onto their entire personality.

To achieve this normality, an individual –and indirectly, society- needs a moral, material, spiritual and social balance. They need certainty and not doubt, be it material, professional, or interpersonal. But "doubt" is now happening. Rising unemployment rates –no matter top or bottom in professional development- in all sectors tend to add to this feeling nowadays, hence the interest for affection and sexuality is harder and harder to find.

If pills such as Viagra, Cialis and Levitra, that were very sought after in pharmacies, were the answer –momentarily, of course- for the man, who still valued his personal potency and eroticism, now their sales have dropped by nearly a half.

Has the man become more potent, liberated from all his inhibitions or his need of decent sexual performance or is it something else? Has he become less interested in sex, his libido nearly gone, putting more emphasis on his survival rather than his sexuality?

Freud's psychoanalytic theory describes the existence of the primary sexual instincts, emotions that if bottled up, at a certain point need to manifest themselves. It is in such a way that sexual conduit, further regulated by cultural, moral and religious norms has degenerated in purely instinctual, going towards exhibitionist and perverse behavior.

At some point during the stages of human evolution -from barbaric to civilized-, B. Malinowski said that "culture begins with the control of instincts". Today we might say that "the manifestation of instinctual behavior is given by the absence of cultural, moral and religious values in the development of individuals", together with the crisis modern society finds itself in.

The idea of a democratic society is interpreted in a wrong way – freedom is replaced by liberation, responsibility is thought of as a barrier which must be eliminated.

The rapport between the members of a conjugal couple is today based on individual freedoms, as opposed to the traditional couples' feelings of trust and responsibility.

Psychologically, sexually, but also morally, youth who want to start a family are completely unprepared. They are much too immature and primitive -behaviorally, of course- to take over the responsibility of building and maintaining a family.

A life of freedom and no responsibility is preffered over a family life that imposes some norms. It is perceived in such a way that the sexual liberation one faces when in a couple is skewed towards an open, libertine, degraded sexuality. "Degraded in what way?" one may ask. An entire erotic industry has spawned in very different ways that maintains a sort of sexual-erotic tension present, provocative and with unconscious negative effects on one's sexual attitude, mentality and behavior.

Present society cultivates and puts forth the sexual "image" instead of sexual affection. Hence, the new "sexual revolution" associates itself with drug use, violence, prostitution, disrespect for work, all leading to a loss in the purpose of life.

The sexual education of youth today is manipulated by the evermore cunning media: many television programs, specialized magazines, chatlines, CDs, and of course, the Internet. Next to the column in the paper that informs us of prices increasing and the current economic situation, we find the provocative and sensual profile of a young girl. Page X. Or the girl giving us the weather info for this week, dressed in very skimpy clothing –although there may be a blizzard outside-.

By stimulating -on a daily basis- one's visual sense with such images, the very mystery fades and masculine curiosity deteriorates. Sexual desire is more present in the brain than anywhere else and can turn into sexual arousal without any other physical or mental stimulus. This explicit erotic material, be it written or in image form represents a source of erotic stimulation, but prolonged exposure to it can create saturation, which in turn reduces the desire for it.

Sexual conduit becomes, in these conditions, a form of collective manifestation, directly represented by symbolic sexual behavior, such as rythmic music festivals / parties (these favoring the pulsional release), association with isolated groups that have as a basis the sexual component or other instinctual behavior –junkies, satanists, delinquents-. Also, we may note group violent sexual behavior, perversions which are "trendy", such as homosexuality and swinger clubs.

The psychological mechanism that collective sexual conduit bases itself on is imitation, negative suggestion and peer pressure further enhanced by a lack of information and education; these types of behavior are very fertile on immature psychological ground, Oedip-based insecurities maybe.

The consequences of these manifestations that come from the "sexual revolution" will be seen in the future. They will affect all aspects of society, way of thought, human relationships and futures of families and individuals in a negative way.

I did not want to debate this subject by making pesimistic, negative and erotic-depressive assumptions, but I asked myself: "Where to, sexuality?", because not the liberation but the reprimation of instincts represent the advancement of a human being and keep him/her from going back to primal behavior.

Relating back to positive models of thinking will save man and invigorate society. It will bring back affection in our erotic interactions, self-trust, respect for one another and for ourselves, sex as a result of love, in other words: a healthy bio-psycho-social sexuality.

BIBLIOGRAPHY

[1] Voichita Mogos , Simona Mogos, "Disfunctii sexuale masculine ", Editura « Gr.T.Popa », U.M.F. Iasi, 2007
[2] Constantin Enachescu, ''Tratat de psihosexologie'', Polirom, Editia a IV-a revazuta si adaugita, 2008
[3] Andre Moreau, ''Ca sa traiesti bine in prezent, impaca-te cu trecutul '', Editura « Trei », Bucuresti, 2006
[4] Florin Tudose, Ana Marian, ''Alfabetar de sexologie'', Editura «Info Medica», Bucuresti, 2004

ISIRR 2009
ROMANIA - HUNGARY - SERBIA

SHORT-TERM URETERAL STENTING IN URETEROLITHOTRIPSY

MITRANOVICI Emil

Emergency Hospital – Deva, ROMANIA

Abstract

The aim of our study was to evaluate for one week the ureteral stenting in patients who have undergone ureteroscopy for ureteral lithiasis.

1. INTRODUCTION

Ureteral stenting has some advantage: for ureteral obstruction is a common procedure because it can mentain his position, also it can be used in thi treatment of ureteral stones under 5mm and for urinary drainage in patients who needed endoscopic or classical surgery.

2. MATERIAL AND METHODS

The study included a cohort of 140 patients with ureteral lithiasis who underwent ureteroscopy followed by ureterolithotripsy. The stone sizes were between 5-10 mm and the chemical composition of lithiasis is: oxalate dihidrat, oxalate monohidrat or uric acid. The operation was performed in rachidian anesthesia with an rigid ureteroscope STORZ 14 Ch and the stones were fragmented with a pneumatic lithotritor STORZ.After the operation we have 109 uncomplicated cases which was randomized into stented A groups 54 patients and nonstented B groups 55 patients. In A groups a 5 Ch polyurethane stent was passed through ureter after lithotripsy. Postoperatively all patients were evaluated for flank and suprapubic pain, clinical renal colic, irritative urinary symptoms, analgesis usage, urinary analysis and culture. During the operation 31 patients suffered complications: ureteral perforations (23 patients), that was successfully treated with temporary stenting for 4 weeks,or failure of lithotripsy in 8 cases which needed ureterolithotomia.Ureteral stents removal is usually performed with the cystoscop without anesthesia at women and with i.v. analgesia at man.

3. RESULTS

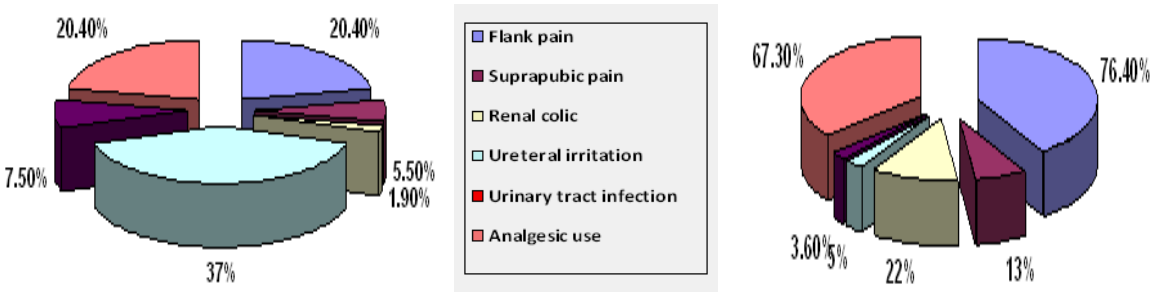
In the first postoperative day in group A 11 patients (20,4%) patients had flank pain while it was present in 42 patient in group B (76,4%).In group A one patient (1,9%) complicated of clinical renal colic comparing to 25 patients (22%) in group B. During hospital stay 11 patients in group A (20,4%) needed analgesic administration compared with 37 in group B (67,3%).Suprapubic pain was reported by 3 patients in group A (5,5%) compared With 7 patients in group B (13%). Ureteral irritation was also more frequently reported in patients who had stent 20 patients (A group 37%) and 3 patients(B group 5%).Urinary tract infection was developedin 4 cases from group A(7,5%) and 2 cases from B group(3,6%).There was no difference in duration of hospitalization between both groups. In this 7 postoperative day only 3 patients in A group (5,5%) complained of renal colic comparing to 11 patients in B group (20%) .No residual stone was discovered on week follow-up radiographics in both groups.

I.Patients simptomatology first postoperative day

	A group	B group
Flank pain	11 patients (20,4%)	42 patients (76,4%)
Suprapubic pain	3 patients (5,5%)	17 patients (13%)
Renal colic	1 patient (1,9)	25 patients (22%)
Ureteral irritation	20 patients (37%)	3 patients (5%)
Urinary tract infection	14 patients (7,5)	2 patients (3,6%)
Analgesic use	11 patients (20,4%)	37 patients (67,3%)

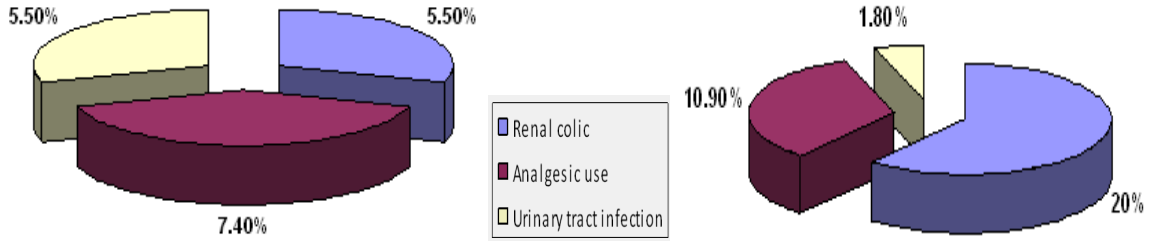
II. Evaluation symptoms in first week after stent-removal

	A group	B group
Renal colic	3 patients (5,5%)	11 patients (20%)
Analgesic use	4 patients (7,4%)	6 patients (10,9%)
Urinary tract infection	3 patients (5,5%)	1 patient (1,8%)



A Group B Group

I.Patients simptomatology first postoperative day



A Group B Group

II. Evaluation symptoms in first week after stent-removal

We have to mention the statistically significant decrease of the symptoms during a week after surgery comparing table I with table II.

4. CONCLUSION

Even if patients with stent developed urinary tract infection or ureteral irritation, ureteral stenting in uncomplicated ureteroscopy and lithotripsy has a considerable role in reducing postoperative morbidity like renal colics flank paine and analgetic usage.

BIBLIOGRAPHY

[1] Ackerman D.,Forsyth M,Halpert L.,Steinberg R.,Lieberman S.:Stent-assisted stone passage in the outpatient setting.J Urol 155,362A 1996.
[2] Golea,ProfDrVirgil Osan,DrCarmen Simion :Ureteroscopia reteograda rigida in terapia calculilor ureterului terminal,post ESWL complicat Revista Romana deUrologie nr 1 p57-59.
[3] Golea O .,Osan V.,Simion C.,Ureteroscopia retrograde rigida in terapia calculilorureterului terminal post ESWL complicat.Rev Romana Urologie 2002 nr1 p57-66 .
[4] SaktiD :Transurethral ureteroscopy and stone manipulation under direct vision.J Urology1981 ;125:112-113
[5] Dretler S.P :Ureteral stone disease.Option for management,Urol.Clin.North.Am.1990,17 :217-230
[6] Hosking D.H,Bard R.J:Ureteroscopy with intravenous sedation for treatment of distal ureteral calculi-a safe and effective alternative to shock wave lithotripsy.J.Urol,1996,156,889-901.
[7] Hubner W.A ,Irby P,Stoller M.L.:The small urinary calculus:natural course and current treatment concepts.Wien Med.Wochenschr,1995,145,267-269.
[8] Morse R.M Resnick I.M:Ureteral calculi:natural history and treatment in an era of advance technology,J.Urol.1991,145,263-265.
[9] Pietro Tombolini, Michele Ruoppolo,Carlo Bellorofonte,Camil Zaatar Matteo Follini:Lithotripsy in the treatment of urinary lithiasis.Journal of Nephrology2000;13,71-82.
[10] George Haleblian ,Kittinut Kijvikai, Jean de la Rosette, Glenn Preminger: Ureteral stenting and urinary stone management.J.Urol.179,424-430.
[11] Osan V., Golea O., Simion C.: Eficienta ESWL in tratamentul calculilor ureterului inferior;Rev. ROmana Urologie nr1 2002 p53-57.
[12] Osan V ., Simion C.:Litotritia extracorporeala in tratamentul litiazei reno-ureterale ;Ed university Press Tg Mures ,2005.
[13] Sinescu I.: Urologie clinica;Ed Medicala Amaltea 1998 ,p162-186.
[14] Slaton J W,Kropp A K:Proximal ureteral stent migration-an avoidable complication.J Urol 1996 nr155:p 58-61

STANDARDIZATION OF THE EXPERIMENTAL MODEL OF ISOLATED PERFUSED RAT HEART ACCORDING TO LANGENDORFF

Nicoleta MIRICA[1], Valentin ORDODI[2], Attila FARKAS[3],
Andreea RADUCAN[1], Oana DUICU[1], Mircea HANCU [1], Norbert JOST[3],
Andras TOTH[3], Alexandru CRISTESCU[1], Danina MUNTEAN[1], Andras VARRO[3]

[1]Department of Pathophysiology, ROMANIA
[2]Department of Cellular and Molecular Biology, ROMANIA
[3]Department of Pharmacology and Pharmacotherapy,
Faculty of Medicine, University of Szeged, HUNGARY
[4]Department of Pharmacology, "Victor Babeş" University of Medicine
and Pharmacy, Timişoara, ROMANIA

ABSTRACT

The isolated mammalian heart preparation established more than one century ago by Oscar Langendorff was critical for the current understanding of heart physiology during the last century. The model is still extensively used nowadays as the most reliable model of acute ex vivo global ischemia. The aim of this paper was to describe the standardization of the experimental model of Langendorff perfused rat heart that will be further used to:

i) study the contractile function in the setting of ischemia-reperfusion injury and
ii) to test novel cardioprotective strategies.

The setup consists of a heart whose coronary arteries are retrogradely perfused with heated and oxygenated buffer solutions through a cannula fixed in the ascending aorta, either at constant hydrostatic pressure or at constant flow rate. The ventricles contract isovolumetrically after the insertion of an intraventricular latex balloon. Global ischemia is achieved by completely stopping the coronary flow followed by different reperfusion times. Normothermic ischemia of different durations was applied and the post-ischemic recovery of contractile function was assessed in order to characterize the ischemic transition from reversible to irreversible injury. The isolated perfused rat heart represents a highly reproducible model and an important tool in modern cardiovascular and pharmacological research.

Supported by RO-HU Bilateral Cooperation Project ID RO 17/2007

ISIRR 2009
ROMANIA - HUNGARY - SERBIA

COMPARATIVE STUDY OF THE RAPID DELAYED RECTIFIER POTASSIUM CURRENT (IKR) IN DOG, RABBIT AND GUINEA PIG CARDIAC VENTRICULAR PREPARATIONS

Dimostenis TRAMBARIS[1], Cosmin NISTORAN[1],
Norbert JOST[2], Laszlo VIRAG[2], Attila KRISTOF[2],
Zsofia KOHAJDA[2], Mircea HANCU[1], Danina MUNTEAN[1],
Andras VARRO[1], Al. CRISTESCU[1]

[1]Department of Pathophysiology, Victor Babeş University of Medicine and Pharmacy, Timişoara, ROMANIA
[2]Department of Pharmacology and Pharmacotherapy, Faculty of Medicine, University of Szeged, HUNGARY

ABSTRACT

The purpose of the present work was to understand the large inter-species variation in the drug effect on repolarization in isolated cardiomyocytes. To this aim the properties of the rapid component of the delayed rectifier potassium current (I_{Kr}) were compared in myocytes isolated from dog (DM), rabbit (RM) and guinea pig (GM) ventricles by applying the patch-clamp a techniques at 37°C. The amplitude of the E-4031 sensitive I_{Kr} tail current measured at -40 mV after, a 1 s long test pulse to 20 mV, in DM was 0.38±0.02 pA/pF, n=12-15) but larger in RM and GM (0.66±0.05 pA/pF and 1.0±0.08 pA/pF, respectively, n=10). I_{Kr} activated rapidly and monoexponentially in each studied species. The corresponding activation time constants measured at 30 mV were: 53±6 ms in DM, 35±3 ms in RM and 30±2 ms in GM, respectively (n=6-26). The deactivation of I_{Kr} in DM and RM measured at -40 mV, after a pulse to 30 mV was slow and biexponential τ_1=0.4±0.02 s and τ_2=3.3±0.3 s in DM ; τ_1=0.6±0.03 s and v_2=6.5±0.3 in RM, respectively, n=8-26), while in GM the I_{Kr} tail current was best fitted triexponentially (τ_1=0.14±0.01 s, τ_2=0.8±0.01 s and τ_3=6.6±.06 s, n=10). These results suggest that I_K in DM and RM resemble with those reported in human by others, and considerably differ from that observed in GM. These findings suggest that the dog and rabbit are more appropriate species than the guinea pig for preclinical evaluation of new potential drugs expected to affect cardiac repolarization.

Supported by RO-HU Bilateral Cooperation Project ID RO 17/2007

METHODOLOGICAL SUPERVISING OF THE MOTOR CAPACITY DEVELOPMENT

GRIGORE Constantin

University Politehnica Timisoara, Faculty of Engineering Hunedoara, ROMANIA

Abstract

Specialized literatures consider the psychomotor capacity as a complex function, an ability that integrates both the aspects of the motor activity and manifestations of the perceptive functions. During the volleyball players training, they make many mistakes because some inaccurate methodological extrapolations and, specially, because of the lack of knowledge of the real dimensions of the original (game model) that must be transposed into the training process by analogy and modeling. The authors fructify and combine their own scientific investigation with the investigations of some international experts, offering a valuable methodological material.

The information obtained by new record or by the specialty literature must scrupulously studied and turned to good account during the training process by the people interested in ensure the quality and the efficiency of the training process.

1. METHODOLOGICAL SUPERVISING OF PSYCHOMOTOR CAPACITY DEVELOPMENT OF A VOLLEYBALL TEAM FROM THE SECOND ECHELON

The psychomotor behavior of every individual evolves based on his abilities, on his physical and intellectual development and on the educational influences that he submitted during his childhood. As a complex function that determines the human behavior's adjustment, the psychomotor capacity includes the participation of different psychical process and functions that assure both the information's reception and the accurate execution of the answering acts. Thru its fundamental components the psychomotor capacity makes possible the pragmatically, esthetical, educational adaptation. Related on the psychomotor capacity, DeMeur underlined some relations that exist between motor capacity, intellect and affectivity. Although, Lapierre considered that the notion of psychomotor capacity is too large to have a precise, categorical and indisputable definition, C. Paunescu underlined that the psychology proves that the motor act represents the foundation of the knowledge and learning organization, so it considerably leads the mental organization of the individual.

Rene Zazzo considers that the psychomotor education represents a fundamental education during the elementary school, because it conditions the entire learning process. The learning process cannot be efficient if the child has not the conscience of his body or he does not know his laterality, he cannot place himself into the space, he does not control the time and he has not enough coordination and stability of his gests and movements. One of the essential life manifestations is the movement; realized by the muscles bound up with the CNS and PNS; the muscles effectively realize the body's accommodation with the permanent modifications of the exterior environment. Based on the information received, NS absorbs and gives orders that, thru the efferent nervous fibres reach to the muscles and connect them by the motor plates; the result is the muscular contractions, translated by the multiple movements made by the human body.

During the volleyball players training, they make many mistakes because some inaccurate methodological extrapolations and, specially, because of the lack of knowledge of the real dimensions of the original (game model) that must be transposed into the training process by analogy and modelling. The authors fructify and combine their own scientific investigation with the investigations of some international experts, offering a valuable methodological material

Many errors made during the players and teams training could be avoided if the technical manager (inclusive teamwork) would have the competence to give correct answers to some distinct questions, as follow:

- Which is the motor structure of the game (the original) or the causes that lead to the specific energetic solicitations and consumption?
- Which are the structural elements of the game or the technical-tactical actions that request foreground improvements of the motor, functional and psychical indicators?
- Which are the energy sources that support the effort?

- Which are the evaluation tests of the parameters and indicators that allow us to lead the training process?
- How, when and with what must begin the training? etc.

The correct answers of these questions are, mostly, depending on knowledge of the principal dimensions of the game's model (of the original or the properly game). Many specialists (foreign or Romanian) as: W. Baleserro (1990), J.O. Betran & J. Tico (1992), R. Colli & M. Faina (1985), D.E. Colibaba (1975, 2001, 2004), G. Cometti (2002), E. Generale & J. Zaragoza (1992), J. Jole (1990), M. Mandoni (1984), A. Predescu (1973, 1975), T. Predescu, G. Ghitescu (2001, 2003), L. Teodorescu, I. Portnah (1986) s.a., studied them.

Mostly of the above said authors agree that the volleyball game (the original) must be analyzed and knew thru some systemically dimensions that, under analogical conditions, can be improved during the training process. Taking into account the above said authors' opinion, but also according to our experience about solving this problem, we agree that the volleyball game model could be represented accordingly to the next dimensions that accept deductive systemically arguments:

- **Motor structure of the game** – that determines three types of functional solicitations:
  - anaerobic alactacid
  - anaerobic lactacid
  - aerobic, with alternative manifestation regime or preponderant mixed, joined by psychological (mental) solicitations and some psychological-social relations between team members.
- **Energetically systems capacity and power**

All these, together, flexibly integrate into the **Cycle of the game's phases.**

Next, we present (as far as spatially possible) the essential aspects of these dimensions and some methodological specifications of development during the training process.

Motor structure of the game represents "the dimension cause that provokes the phenomenon effect, namely it determines and, ulterior, it is determined by the physiological, energetically, psychological solicitations etc.

Motor structure of the game, specific to the volleyball game is identified by the follows distinct elements:

1. Natural" skeleton" of the game constituted by:

- fundamental motor capacities and skills (running, walking, jump, volley) mixed and adapted to the game's specific.
- motor abilities adjacent to the motor capacities and skills, hereditary or/and anterior obtained (power, speed, resistance, coordination etc);
- favorable physical development (anthropometric sizes and body constitution);
- psychomotor and psychosocial capacities, hereditary or socially learned (family, entourage, friends)

This natural motor construction (hereditary) is precious and, in the same time, very important, especially during the initial selection process. Ulterior, it is improved and consolidated by a permanent athletic training.

2.Technical motor capacity, specific to volleyball (the elements and the specific technical methods) represent an ensemble of movements (simple, complex, partial, integral, interdependent, cyclic and acyclic, symmetric and asymmetric), different as shape and amplitude and variably or flexibly mixed, depending on the game situation or on the adversary performance.

The most important groups of elements and technical methods are:

2.1. Ball elements and technical methods (heavy of 657 group M and 600 group F) that request a high virtuosity to control, handle and send the game object. They include:

- Diversity of the ball striking methods, when the ball is in the air - flexible, depending on the diversity of the ball catching, keeping, controlling, handling, feint, protection methods etc, and all these under the adversity and physical and psychical solicitations conditions.
- Diversity of the ball striking methods in offensive or in defence - flexible, depending on the spatial and temporal variability, on the position and reactions of the adversary, on the triple threatening feint effects, on the physical and psychical solicitation regime, on the tiredness etc.

2.2. The elements and technical methods without ball or the movement elements on the field:

- Offensive: necessary to make the individual and collective tactical actions, related to the offensive phases.
- Defense: necessary to make the individual and collective tactical actions, related to the defense phases.

3.Team individual and collective tactical actions (offensive and defence):

The technical structure stereotypically executed, without obstacles or opposition (adversaries, partners, referees). If they appear (lxl, 2x2, 3x3, 2x1, 3x2 etc.) then, they are consciously executed and tactically thought-out.

All the tactical actions (individual, collective, of team) contain interdependent technical elements under the form of operational schemes of game situations' resolution.

4.Specific motor qualities related with the technical methods and the tactical actions:

- speed, differently manifested (reaction, execution, repetition, movement) involved in the technical methods with and without ball, in the tactical actions, in the game phases, in combat on the net etc.
- speed is aided by power (0-5 sec) and capacity (5-20 sec) anaerobic alactacid. The player uses ATP and PC to make maxim efforts: short and rapid sprints, maxim repeated jumps, changing direction, acceleration - deceleration etc.
  The next forms of speed manifestation are involved:
  - reaction speed of visual, acoustic and tactile stimulus;
  - execution speed (rapidity of motor gesture);
  - repetition speed (rapidity of a motor gesture repetition);
  - movement speed - frontal, back, lateral oblique - in fundamental offensive and defence
  - position.

The force is the quality that fundaments the specific physical training of the volleyball players. According to the modern concept of training, to train for force does not necessary mean to develop the force indicators. It means, firstly, to prepare the muscular and functional system involved into the specific instruction regime, concretized by morphofunctional improvement, namely by increasing the contraction capacity, oxidation capacity, muscular flexibility, inter and intramuscular coordination, perfecting of energetically mechanism and, of course, of the force indicators. During the training of volleyball players, the next types of power manifestations have priority:

- Dynamic power that presumes the improvement of all muscular groups (m) geared by the locomotory system in the motor structure of the game, it means:
  - musculature of feet, back, arms for displacement, throwing and pass;
  - abdominal, dorsal, lumbar musculature in order to maintain the equilibrium;
  - musculature of thighs and shanks for jumps, changing the direction and defence game.
- Maximum force - realized by maximal and under-maximal charges (also named by some authors the slow force).
- Force as resistance regime (power) - to use lightly the dexterities with high frequency during the game.
- Rapid force - detente or speed as force (V+F) necessary to jump, to sprint, to strip off shortly, acceleration, change of direction.
- Explosive force (F+V) - placed at the arms' level and necessary to send the ball (pass, throwing).
- Static force and robustness – particularly necessary to the central players (pivots) in the net struggle (blocking plan's occupation, placement, body struggle, stability in field, etc.)

General aerobic resistance (aerobic capacity and power) sustains the development of the other capacities and abilities. They improve it by solicitations of medium intensity and for long time, respectively for more than three minutes the body can adapts the big effort functions, becoming stable. Anaerobic resistance or anaerobic capacity lactacid and alactacid are the quality educated by high intensity solicitations and for almost short time (20-120 sec). FOR VOLLEYBALL GAME, these solicitations time are majority. The appearance and the accumulation of the lactic acid limit the work time. The consumed energy is produced without oxygen, a very important thing for the technical dexterity under the tiredness regime or at the end of the game.

The articular mobility and the muscular flexibility assure the elasticity and the amplitude of the movements.

The skill is a complex psychomotor ability characterized by perspicacity and promptness of finding some motor solution to solve efficiently some game difficulties, anticipated or unanticipated. This ability optimally integrates or combines the next dimensions of motility:

- capacities perceptive - sensitive - representative (visual acuity, peripheral sight, kinaesthesia and spatial-temporal difference, coincidence time, ball sense, placement sense, operational schemes of action, image - body scheme, idiomatic - motor representations),
- neuromuscular coordinative capacity (general, segmental and intersegmental, eyepiece segmental), a movements precision and address,
- mobility and flexibility,
- static and dynamic equilibrium,
- agility and implementation capacity of the indicators of other motor qualities.

Some of these components of ability obtained the status of relative independent abilities, being educated by some special programs of training. Examples: education of taking precision, agility education, ball sense education etc. In volleyball game, in fact, in all sport games, we cannot solve the tactical game situations only by the coordinative capacity, therefore we plead for the concept of ability,

in the meaning of above definition.

It is important to know and to model in training: distances covered, types of displacements, displacement speed, frequency of jumps, stops, change of direction, pirouettes etc, solitarily made by each player, on the posts or integrated into the tactical actions, individual, collective and of team.

In the next tables, we mention the principal dimensions of the motor structure of game and of the specific effort of volleyball game:

Table 1. Types of important actions (according to R.Colli, M. Faina)

No.	PARAMETERS	INDICATORS
1.	Standard length of game (SLG)	SLG = 4x10 min (or 2x20) = 40 min. timed plus "n" in overtime of 5 min for finishing tied
2.	Number and total length of interruptions (TLI)	Number of interruptions = about 150/match TLI - about 23-30 min. without interval between quarters and reprises
3.	Effective length of match (ELM)	ELM = SLG + TLI = 40 + 23 = 63 min (to 70 min) * at 63 min (100%) from which: - 37% action: 10% rapid action and - 27% slow action - 63% interruptions 27% - displacements 36%
4.	Percentage weight of effort period and the interval	Effort% Interval% 1-10 sec 5.4% 5.1% 11-40 sec 52.0% 41-60 sec 14.0% 20.1% 61-90 sec 14.7% 13.8% 91-120 sec 8.7% 4.3% more than 120 sec: 2-3 time/match
5.	Number of consecutive team action (without interruptions)	No. act. No./match x average Length% 1 act 16.33x19 sec 310 sec 13.0% 2 act 10.33x34 sec 350 sec 14.0% 41.8% 3 act 7.00x49 sec 343sec 14.4% 4 act 5.33x58 sec 307 sec 12.9% 5 act 5.00x85 sec 425 sec 17.8% 30.7% 6 act 2.33x90 sec 207 sec 8.7% 7 act 4.00x110 sec 444 sec 18.6% 27.3%
6.	Length and causes of interruptions	11-40 sec (52% of total interruptions) resulted from: ball out, personal mistakes, referees, technical mistakes, regulation infringement, engaging between two players 20 sec - free throwing after basket, player change 41-60 sec: free throwing, accidents, elimination for 5 faults; 60 sec: time-out (8x60sec) + 2x150 sec (2.3 min) in the fourth quarter for TV; 61-80 sec: repeated free throwing; 3 free throwing, timeout + free throwing; > 120 sec: at 2/3 matches for conflicts between players, technical installations reparations
7.	Solicitations density (SD) reported to the standard length of game, namely SD = SLG/TLI	SD = 40 min = 240 sec; TLI = 63 min = 3780 sec 70 min = 4200 sec SD = 2400/3700 = 0.65% or 65% SD = 2400/4200 = 0.57% or 57%
8.	Modelling of sequential density of training effort (SDTE)	Length of exercise (LE) = 5 min = 300 sec from which 200 sec effective work (EWL) SDTE = EWL/LE = 200/300=0.67 or 67%
9.	Training density (TD)	Training length 120 min = 7200 sec Length of effective work 55 min = 3300 sec TD = 3300/7200 = 0.45 or 45%

Table 2. Intensity of solicitations for each post

ACTIONS/QUARTERS	I	II	III	IV	TOTAL
Sprints	3	3	2	2	10
Sprints with ball	1	1	0	0	2
Accelerations - offensive	12	18	19	6	55
Slow running	29	28	40	22	119
Slow running with ball	4	2	3	4	10
Normal defence	12	9	12	11	44

Table 3. Types of actions

TYPES OF ACTIONS	PERCENTAGE
Reserves' bench	3%
Running with or without ball	36%
Acceleration with or without ball	6%
Sprints	2%
Rapid actions - offensive	10%
Defence	10%
Interruptions (intervals)	14%
TOTAL	100%

Table 4 Types of actions

TYPES OF ACTIONS (cardiac frequency/min.)	BACK	EXTREME	CENTER
Defence of player with ball	172	171	169
Defence without ball	167	166	164
Defence of weak part	164	154	154
Slow attack passing	167	162	161
Average speed passing	174	171	170
Rapid passing	175	175	177
Rapid passing by dribbling	195	rarely	no
Throwing (jump, running)	208	207	204
Jumps tracking (offensive/defensive)	178	174	180
lxl without ball	169	166	167
lxl with ball	183	178	178
Ball blockage (stop)	rarely	rarely	175
Game interruptions	150	158	153
AVERAGE SOLICITATIONS ± S	175.2 ±15	171 ±14	171 ±14

Table 5 Anaerobic alactacid system

TYPE OF EFFORT dimensions	ANAEROBIC ALACTACID	
	CAPACITY	POWER
Optimal work time	5-20 seconds	1-5 seconds
Optimal work intensity	95-100% of maximum intensity during the entire work time	90-100% of maximum intensity or of individual possibility
Cardiac frequency (control)	Over 210 beating/min.	Over 200 beating/min.
Restoration (necessary pause)	60-180 sec between repetitions 6-8 min between series, 70% of energetically reserves recovery in one minute 100% of energetically reserves recovery in 3 minute	120-180 sec between repetitions 6-8 min between series
What we educate, develop, coach	- speed resistance, force - speed + force, force + speed - technical abilities < 10 sec - tactical abilities < 10 sec - power, agility < 10 sec	Maximum force - speed + force - force + speed
Examples of means and methods	4-5 x 100m at maximum speed 4-5 repetitions at 95-100% of maximum force 10-15 maximum jumps with a heavier belt (3-10 kg)	4 series x 4 x 30m maximum speed -1-2 heaving weights 100-110% of maximum force - 1-2 maximum jumps with
Verification tests	pushing of bells from dorsal lying position	weight of 10-20 kg sprint with medium time on 10,20 and 30m - detente - Bosco jumping board
Influence factors	ATP and PC muscular reserves - enzymatic activity	
Other recommendations	- Every series must work for power maximum 1 minute before resting. - Total volume of rest of real work time must vary between 3 and 6 min.	

Table 6 Anaerobic lactacid system

TYPE OF EFFORT dimensions	ANAEROBIC LACTACID	
	CAPACITY	POWER
Optimal work time	1-3 min 60-90-180 sec	20-60-90 seconds
Optimal work intensity	90-95% of maximum intensity	90-100% of maximum intensity
Cardiac frequency (control)	180-220 - young people 160-200-adults	180-210 beating/min.
	UNDERMAXIMU	M
Restoration (necessary pause)	2-5 min between repetitions 8-15 min between work series	5-15 min for 60-90 sec solicitation 2-5 min for 20 sec solicitation
What we educate, develop, coach	- speed resistance - effort resistance - musculature	- muscular force - detente
Examples of means and methods	- 3 series 2x600m - technical-tactical exercises of intensity 90-95% - modelling practical exercises - relation 3x3, 4x4, 2x2 on the entire field	-4 series x 4 x 300m with 3 min interval between the repetitions and about 10 min between series - active pause: respiration exercises, stretching, basket throwing etc.
Verification tests	- how much they run in 3 min, maximum speed	- little marathon - big marathon
Influence factors	Lactacid concentration allows to continue the effort	
Other recommendations	- Real work volume for every series 2-4 min - Real work volume on 10-12 min interval	

Table 7 Anaerobic energetically system

TYPE OF EFFORT dimensions	AEROBIC	
	CAPACITY	POWER
Optimal work time	Over 15 min	3-5 (6) min 180-300-360 sec
Optimal work intensity	70% of maximum intensity	80-85% of maximum possible, even 95% of possibilities
Cardiac frequency (control)	X=120±20	- young people - 220 ± beating/min. - adults = 160 ± beating/min. - for under maximum intensity CF max - minus 5-10 beating/min.
Restoration (necessary pause)	It is not necessary. Tiredness does not appear	- for effort of 5 (6) min - recovery = *Vi* + *lA* of effort length - or CF diminishes to 90-110 beating/min. - for 10 min solicitation, active recovery of 5 min
What we educate, develop, coach	- general resistance - ability - learning of technical methods	- endurance - substantiation of speed resistance -force - speed technique and tactics
Examples of means and methods	- running on the flat field, varied with average tempo, uniform	- 3x400m - 3x500m - 3x800m - 3x100m; - 3x1500m, technical-tactical exercises during 3-5 min, under maximum intensity
Verification tests	- Jogging; Speed - Talck; Fartlek - cross 5-15 km (M), 3-5 km(F) - Cooper = 12 min Long technical-tactical complex - Cooper, Karvonen tests etc	- 400,800,1000 m - Brue-Gacon bicycle - Leger - Bouchet shuttle
Influence factors		- Oxygenation capacity of the body - Energetically and endocrine system - Cardiovascular and respiratory system - Respiratory frequency and vital capacity - Diaphragm - costal respiration
Other recommendations	- Global work volume about 20-60 min during preparation time	10-20 min during before competition time; 10-15 min during competition time

2. Comments

a)Getting the energetically resources

The secret of fructifying these effort dimensions is revealed by the three sources of energy, supplied to the muscle, that is to say:

First anaerobic alactacid system: muscular fibres use ATP molecules adenosine-triphosphoric and PC (phosphocreatine), directly from their content. This delivering of energy phenomenon lasts 10 sec when we work at maximum intensity; Second anaerobic lactacid system: production of ATP made by aerobic glycolysis of blood, where the muscular glycogen and blood glucose (both carbohydrates substances) are separated (metabolized), producing high coefficient ATP. ATP + PC and the glycolysis systems are anaerobic (they do not need oxygen). Glycolysis allows to muscle to work at very high intensity, but it leads to the formation of lactic acid in muscles and blood. Accumulation of the lactic acid leads to a slow anaerobic glycolysis and to the installation of tiredness after about 3 min of intense work. Therefore, to reduce the lactic acid of muscles and blood, we have to interrupt the effort or to continue it but at a diminished intensity. Consequently, we find the third energy source, namely aerobic way; The third aerobic way: supplying energy for efforts longer than 2-3 min, when all the three systems are involved (ATP+PC; glycolysis - aerobic system). Energy sources contribution is very important to establish the length, intensity and methods of work.

b)Capacity and power of energetically systems

In volleyball, the aerobic efforts alternate with the anaerobic efforts (especially, lactacid and, more rare, alactacid). Episodically, there are phases or short moments (10-20 sec) of time when the players solicit their bodies at maximum (220 beatings/min). It supposes to pass in anaerobic alactacid status and to reach the functional anaerobic lactacid status underlined by apparition of lactic acid in muscles (example: continue pressing all over the field with contra attack, throwing, body struggle under the panel, repeated jumps about 10-20 sec + continue other actions 90-100 sec).

During the game, all the three types of solicitations, above mentioned, appear, it means anaerobic alactacid, anaerobic lactacid and aerobic. In all mentioned energetically systems, we have to make the difference between capacity and power, namely:

- Capacity represents the total energy that the player disposes to accomplish the requested solicitations or the energetically availability for a large work volume - work resistance under anaerobic alactacid regime, anaerobic lactacid regime and aerobic.
- Power (potentiality) represents the intensity of respective solicitations manifestation - body reaction speed or vitality.

Therefore, it is very good to know exactly the optimal stimulus of the capacity (anaerobic alactacid, anaerobic lactacid and aerobic) and the optimal stimulus of the power of these energetically systems. This is a very important aspect of training process, especially, when the subject is the development of the motor abilities that, without some optimal stimulus, do not lead to the expected progress.

In the same time, it is recommendable to begin by education of the energetically capacity and ulterior, of the energetically power.

c) Energetically resources recovery

The relation between the consumed energetically process and the resources recovery was studied and it is, generally, known. In this way, T. Bompa (2003, p.209) offers us the next table of the three energetically systems restoring:

Table 8. Restoring time of the three energetically systems

ENERGETICALLY PROCESS	MINIMUM	MAXIMUM
Restoring of muscle phosphagen (ATP and CP)	2 min	3-5 min
Length of lactic acid 02 elimination	3 min	5 min
Myoglobin restoring	1 min	2 min
Length of lactic acid 02 elimination	30 min	60 min
Resistance of muscular glycogen: a) after intermittent activities b) after a long, continue activity	- 2hours to recover 40% - 5hours to recover 55% - 25hours to recover 100% - lOhours to recover 60% - 48hours to recover 100%	
Lactic acid elimination from muscles and blood	- 10 min to eliminate 25% - 25-30 min to eliminate 50% - 60-75 min to eliminate 95%	
Resistance of hepatic glycogen	unknown	12-24 hours

To know the lactic acid accumulations and its elimination time is very important for a coach (table 8).

c) Methodological development

The information presented in the previous tables must turn to good account during the training process:

Firstly, define these lengt	ı steps in order to identify the work system:	
ANAEROBIC ALACTACID	ANAEROBIC LACTACID	AEROBIC
ATP + PC	Aerobic glycolysis	aerobic
1 - 10 sec	10 sec-3 min	Over 3 min
Sprints, change of direction, jumps etc	Continue effort	Game length

This bio-energetically scheme is very important so that the player could endure the effort of this kind: defensive pursuit + contra-attack sprint + throwing and offensive pursuit with the defender opposition. This kind of action of high solicitation leads to the exhaustion of all energetically resources in 7 - 10 sec, from which only the contra-attack last 4-5 sec; the recovery of this energy last 20 sec 9if the player interrupts the effort) or he "moves down" on the aerobic recovery fund of some lower intensity exercises.

During the match, a low concentration of lactic acid accumulates in blood and there is a small recovery of this energetically metabolism. A training program must content the next elements:

- Number of sprints: minimum 3 sprints
- Cover distance begins, for example, with 800 m, and then the running distances become shorter to maintain a high intensity: 2x400; 4x200; 8x100; 4x100 and 8x50m etc.
- Effective work time (example, 30 sec)
- Rest interval: at the beginning 90 sec and then, according to the covering distance time.
- Solicitation/repose relation: 1:3; 1:2; 1:1.
- Total covered distanc4e during a training (it must be more than 3200 m; 2 - 2.5 miles, according to S. Brown, 1993).

Number of training on week

- medium and long running: 2-4 x/week;
- short sprints: 3-5 x/week.

Other methods of anaerobic functional capacity development:

- accelerated running alternated with walking or jogging;
- fartlek adapted to high intensity efforts.

Examples: 400 jogging + 200m walking + sprints alternated by 100m walking (10 min) + running on the hill 100m and 100m walking (6 min) + sprint of 50 m alternated by 50m walking (3m). Under the limits of anaerobic solicitations, appears also the development strategy of speed, detente, agility, maximum force and power. For develop the named qualities they use the so-called

neuromuscular training, with the follows amendatory: a more efficient sending of the nervous impulses to the effectors muscles, a more efficient coordination inter and intramuscular, collection of more rapid muscular fibres that act stronger in order\r to make the movements.

Neuromuscular strategy belongs to the next methodological way (conf. T. Bompa, 2003; Colibaba, 2004, G. Cometti, 2002 etc):

1. Adaptation period of the body or the period of morphofunctional substratum preparation and of the cardio respiratory system for the next neuromuscular solicitations. This step lasts about 3-6 weeks, depending on the age, experience, training level, training time etc. They work especially for the entire musculature (global or selective for the stabilizer musculature), for the resistance, skills, technique etc. (conformable with the training time - phase I).
2. Maximum force development (Fmax) high charged (70-110%) and few repetitions (1-2). Fmax development means the development of the recruited rapid fibres (FT - fast twitch = fibres). This result appears only by rising heavy dumb bell. Work time for Fmax is about 4-6 weeks. They use different weighting exercises as the genuflections, abdomens, rising on the toes etc. (training, phase II).
3. Power development or the improvement of the coefficient of engagement or discharging the rapid muscular fibres. On this purpose, they use some charges lower than 70% of maximum possibilities, but made with maximum rapidity. They use explosive, rapid and strong movements as jumps, sprints, throwing etc. On this purpose, they use plyometric exercises, with medicinal balls, agility exercises, jumps with genuflections, acceleration-deceleration with the medicinal ball etc. They work 4-5 weeks (2 training x 30 min) necessary recovery 1-4 min after each exercise; (it corresponds with training phase III or before competition).
4. Maintenance of Fmax and power index during the competition time for keeping the neuromuscular adaptations anterior realized (detente, speed, agility etc.). Therefore, they work also during the competition time, for force and power 2 times every week (it corresponds with the competition time).
5. During the transition time, we try to maintain the force anterior obtained. Generally, they work, 2 times every week of 40-60 min, low charge for the antagonistic and stabilizer muscles.

Aerobic energetically system (oxidative)

- It needs at least 3 min effort to install the real stable condition (stady sted); it means equilibrium between the oxygen contribution and the oxygen necessity of the body. Generally, they work for the aerobic system minimum 10-20 min during the competition time and depending on the training level presented during the training time.
- We must distinguish the differences between the aerobic capacity and the aerobic power;
- Aerobic capacity is educated by appliance of low and medium intensity efforts that last more than 15 min. In volleyball, they use long running (until 60 min), uniform rhythm, 70% maximum intensity, cardiac frequency of 120-164 beating/min;
- Methods: continue effort, Fartlek, Talk-Speed etc.
- Aerobic power needs efforts of 3-5 min, 80-95% maximum intensity; lot of energy consumption; it ensures the foundation of the physical condition in volleyball; it is recommendable to work at under maximum intensity and with pauses of 1/3 and ¼ of effective work time. Example - a 3 min effort = 3x60 sec = 180 sec; 1/3 and ¼ of 180 = 90 and 45 sec; in pause, FC recoveries about 120 ± beating/min.
- Aerobic training is considered one of the most efficient recovery means. In this way, after a very hard period, when we are very tired, we can use the aerobic training to oxygenate the body, to eliminate the toxins by perspiration and the lactic acid by its decompositions in contact with O_2.

Cycle of the game's phases

The game is permanently animated by the battle between the two teams in order to win the ball. This dispute is limited by a series of moments that indicate the game's phases for the both teams. Figure 1 surprise very well these game's moments and phases which, joined by records (numbers) permit us to make a close analyze of the game performed by team and by every player apart. From presented photo, it is important to remember:

a. when the team A get the ball, it begins a five moments cycle (I-V) who, ideally, should finish by success (V);
b. team B simultaneously goes through the same moments and phases in reverse order (V-I), it means in defence. It is ideal that the team B gets as rapid as possible the ball, before the team A reaches the final phase;
c. the number of ball possessions cannot be equal for the both teams. Difference appears when the ball does not belong to any team, respective: at the beginning of the match, during the engaging between two and, especially, during the offensive and defensive followings, when the ball does not belong to anyone (consequently appears the rule "who dominate the net wins the game"!);

d. calculate the length of the attack and defence phases in order to appreciate the game tempo; find the optimal rhythm and tempo for your own team.

To improve the game performed by the personal team and to settle some real instructional objectives, it is recommendable to proceed as follow:

- Analyze very carefully the ball winning moments (I) and the ball loss moments (V).
- Analyze the other game's moments and phases to identify the strong and the weak points of the game performed by your team.
- Systematize the conclusions on three game components: attack, defence and panel follow (offensive and defensive). In this way, it will be much easier to make the algorithm of the objectives based on the training periods.
- All the game sequences (moments, phases, relations, game tempo etc.) are trainable.
- You can analytically approach them, in cyclic succession, in antagonistic relation, under physical and psychical solicitation or under analogical conditions.
- Try to identify any relations between the effort's dimensions and the cycle of game's phases.

3. Conclusions

The information obtained by new record or by the specialty literature must scrupulously studied and turned to good account during the training process by the people interested in ensure the quality and the efficiency of the training process. Nevertheless, we underline the next significant conclusions:

- it is the principal dimension of the original that must be scrupulously analyzed for avoid the incorrect extrapolations from other disciplines (athletics, dumb bell etc) and the methodological confusions committed in solving the training objectives. Essentially, this motor structure specific to volleyball supposes the transfer and the modelling of the work regime of the locomotory system, by training; it includes the adjacent anticipated improvement (morphological, functional, energetically and psychological).
- Volleyball is a sport game with a great motor diversity and complexity that alternatively implicates the three mentioned energetically mechanisms: anaerobic alactacid, anaerobic lactacid and aerobic. Alternation or combination of the solicitation is limited by the next relative values:
  - 10-30 sec - anaerobic alactacid + anaerobic lactacid
  - 30-90 sec - anaerobic lactacid + anaerobic alactacid
  - 90-120 sec - anaerobic lactacid + aerobic
  - identify the optimal relation between solicitation regime and the length of the optimal rest intervals;
  - limit the instructional objectives directed to the capacity and power of energetically systems.

From the specific motor qualities, much confusion appears during the training for force development. In this view, we specify the follows:

- in present, they use the force training as principal mean of muscular system preparation, of contraction capacity, of inter and intramuscular coordination, of oxidation, of muscular flexibility, of energetically mechanisms improvement, of force indicators etc. that, together, contribute to the permanent increase of physical specific training level;
- during the traditional training, they worked according to the Russian pyramid model, it means with small charges (8 x 70-75%) and it ended with big charges and small number of repetitions (1x100%). consequently, they worked for resistance, for slow fibres (slow-twitch =ST - red). Today, after a period of muscular system global training, they begin by very big charges (1-2 x 85-110%) and, gradually, they pass to lower charges and more repetition. As a second variant, they work for rapid muscular fibres (fast-twitch = FT-white) and they consider that the neuromuscular system is relaxed and prepared for increasing the maximum force;
- attention when they pass from the specific training for maximum force development to the power development and resistance training;
- use alternatively and/or in combination the muscular contraction types (concentric, eccentric, plyometric, isometric and by electro-stimulation).

Bibliography

[1.] BETRAN, O &J, JORDI, T.&CAMI, I., La capacita motorie nella pallacanestro. In: Rivista di cultura Sportiva. Roma, Anno XI, nr. 24, 1990

[2.] BOMPA, T.O., Performanta in jocurile sportive, Bucuresti, EX PONTO Publishing house, 2003 (Performance in sports game)

[3.] BOMPA, T.O., Teoria si metodologia antrenamentului. Periodizarea. Bucuresti, EX PONTO Publishing house, 2002 (Training theory and methodology. Periodicity)

[4.] COLIBABA, E. D. BOTA, Jocuri sportive - teorie si metodica, Bucuresti, ALDIN Publishing house, 1998 (Sports games - theory and method)
[5.] COLIBABA, E. D. Modelul de joe si modelare. In: Disobolul., Bucuresti, ANEFS, no. 4, 5, 61997
[6.] COLIBABA, E. D. SUFARIU N., Volei. Pregatirea musculara. Conferinta stiintifica internationala, Pitesti, 2004 (Volleyball game. Muscular training - International Scientific Conference).
[7.] COLLI, R. & FAINA, M. Volei - Studiu asupra prestatiilor performantiale. In: Rivista di Cultura Sportiva. Roma, no. 2, nuova serie, nr. 24, 1985 (Study of performances)
[8.] EPURAN, M., Metodologia cercetarii activitatilor corporale. exercitii fizice. Sport. Fitness, editia a 2-a, Bucuresti, Edit. FEST, 2005 (Methodology of researching the body's activity, Physical exercises. Sport. Fitness.) FEST Publishing house.
[9.] MESSINA, E. Preparatione della squadra. Bologna, Zanichelli editore S.p.A., 1999
[10.] PREDESCU, T., GHITESCU, G. Volei - Pregatirea echipelor de performanta. Bucuresti, edit. Semne, 2001 (Volleyball game - Training of high-performance teams; Semne publishing house)
[11.] SUFARIU N., Ergogeneza efortului in jocul de volei (lucrare nepublicata) Referat nr. 1 - teza de doctorat, Universitatea Pitesti, 2005 (Effort's ergo-genesis during volleyball game; unpublished work; Essay no.l - Doctoral dissertation)

INFORMATION TECHNOLOGY SYSTEM FOR THE EVALUATION OF PHYSICAL EDUCATION TESTS

Constantin GRIGORE, Vasile ALEXA, Sorina ŞERBAN

University "Politehnica" Timişoara, Faculty of Engineering Hunedoara, ROMANIA

Abstract:
This work presents an IT system made in order to eliminate subjectivity during the assessment of the baccalaureate candidates at the physical education and sport test, and at the same time to grade them in real time. The IT system also has the capacity to offer the specialists in the field information regarding the strong and weak points of the candidates' training for taking this test, through different statistic data.

Keywords:
Baccalaureate, evaluation, methodology, databases

1. THEORETICAL CONSIDERATIONS

During the 2009 baccalaureate examination, the education discipline comprised in the Physical Education and Sport curricular area is an optional discipline within the F test, for the students of high schools with profiles different from the ones with sports program.

At the practical test Physical education and Sport all candidates from high schools belonging to all profiles and specializations can register, irrespective of the number of specialty classes allotted according to the curricula of the education system.

The candidates that opt for this test take full responsibility regarding the compatibility of their own level of sport preparation with the level of exigency imposed by the Baccalaureate Examination.

Competences that evaluate the level of general and specific motive capacity of practicing 4 sport disciplines/tests.

Each candidate will be evaluated at 4 tests:

Test I: One test chosen from the following:

1. 50 m speed running, start from the ground;
2. Distance weight throwing from the spot;
3. Length jump at the sand pool with take-off.

Test II: One test chosen from the following:

1. Jump over the buck in wide hold;
2. Imposed exercise from acrobatic gymnastics.

Test III: One test chosen from the following:

1. Push-ups
2. Torso lifts from lying down on the back;
3. Length jump from the spot.

Test IV: One test chosen from the following:

1. Technical structure from basketball;
2. Technical structure from volleyball;
3. Technical structure from handball.

All the 4 tests are compulsory for the candidates and they are marked individually for the performance obtained at each test.

After each test, a member of the Examination Board reads out loud to each candidate the performance, the mark received and its effect.

For the optional acrobatic gymnastics and sport game tests the marking takes place based on observing the performance. The examiners appreciate the candidates' performance individually, with integer grades; the difference between the grades must not be bigger than one. The grade given by each of the two examiners reflects the structures' correctness, fluency, expressiveness and/or efficiency. The final grade at these tests is the arithmetic means of the grades given by the two examiners.

For the 2 tests, the grading takes place by transforming performances into grades, according to table 1. The grading is done only using integer grades.

Tab. 1. Transforming performances into grades

Measurable sport tests	Grade 5		Grade 6		Grade 7		Grade 8		Grade 9		Grade 10	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
50 m speed running, start from the ground (sec.)	7.5	8.5	7.4	8.4	7.3	8.3	7.2	8.2	7.1	8.1	7.0	8.0
Length jump from the spot (m)	2.15	1.65	2.20	1.70	2.25	1.75	2.30	1.80	2.35	1.85	2.40	1.90
Push-ups (no. of repetitions)	19	9	20	10	21/22	11/12	23/24	13/14	25/26	15/16	27	17
Torso lifts from lying down on the back	17	15	18	16	19/20	17/18	21/22	19/20	23/24	21/22	25	23
Distance weight throwing from the spot (m)	5.40	3.80	5.65	4.15	5.90	4.40	6.10	4.60	6.30	4.80	6.50	5
Length jump at the sand pool with take-off (m)	4.0	3.00	4.10	3.10	4.20	3.20	4.40	3.40	4.60	3.60	4.80	3.80

For all the tests the candidates have only one trial, except for the length jump from the spot. For the sport games:

- The board appoints the person who will pass the ball to the candidate;
- If the performance is encumbered or interrupted due to the passer's fault, the board can rule its repetition without disqualifying the candidate.

The passer will be placed in a 1-meter radius circle drawn as follows:

- At the intersection of the centre line with the lateral line of the field (basketball, handball, football);
- In the center of area 2 (volleyball).

The candidates will start their performance:

- From the free throwing line of the field (basketball);
- From the centre of the 6m semicircle line of the field (handball);
- From the back line of the field anywhere on its length (volleyball);
- From the back line of the handball ground (football).

The tests will be held:

- For basketball: with rings situated at the proper height;
- For handball: with balls of specific sizes, different for boys and girls;
- For volleyball: with the network situated at proper heights, different for boys and girls;
- For football: on the handball ground.

2. APPLICATION PRESENTATION

The students' option for sustaining the practical test at the Physical Education and Sport school subject within the Baccalaureate Examination is done on individual cards in due time, as foreseen in the Regulation, cards that must be registered at the secretariat of the school they belong to.

According to the material equipment of the school mixed or unisex candidate groups are created so as to ensure their proper examination.

The compulsory order of the Baccalaureate practical test performance is the following:

1. The chosen test of the 1st test group;
2. The chosen test of the 2nd test group;
3. The chosen test of the 3rd test group;
4. The chosen test of the 4th test group;

The candidates that opt for the sport tests of Physical education and Sport have to show the medical approval "CAPABLE OF PERFORMING THE SPORT TESTS AT THE 2009 BACCALAUREATE EXAMINATION", which is a compulsory condition for examination enlisting.

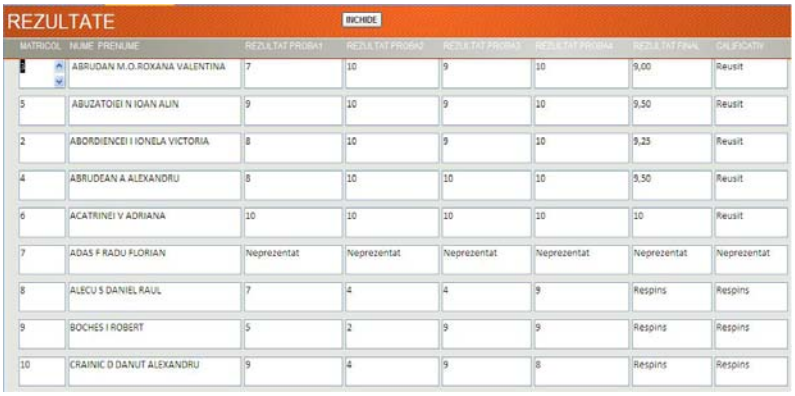
Fig.1 The interface of the IT system

This IT system can centralize the data at the county level, which will allow the specialty inspector the possibility to perform a SWOT analysis with a view to reconciling the analytical programs with the result reality.

Fig.2. The enlistment card

Thus a database has been made which offers the examiner the possibility to evaluate in real time the candidates enlisted for this test. The interface allows the effortless identification of the following elements, namely:

- The candidates' enlistment cards;
- The candidates' last and first names;
- The tests chosen by the candidates;
- The list with the candidates enlisted for this test;
- The results and statistics.


REZULTATE

INCHIDE

MATRICOL	NUME PRENUME	REZULTAT PROBA1	REZULTAT PROBA2	REZULTAT PROBA3	REZULTAT PROBA4	REZULTAT FINAL	CALIFICATIV
1	ABRUDAN M.O.ROXANA VALENTINA	7	10	9	10	9,00	Reusit
5	ABUZATOIEI N IOAN ALIN	9	10	9	10	9,50	Reusit
2	ABORDINCEI I IONELA VICTORIA	8	10	9	10	9,25	Reusit
4	ABRUDEAN A ALEXANDRU	8	10	10	10	9,50	Reusit
6	ACATRINEI V ADRIANA	10	10	10	10	10	Reusit
7	ADAS F RADU FLORIAN	Neprezentat	Neprezentat	Neprezentat	Neprezentat	Neprezentat	Neprezentat
8	ALECU S DANIEL RAUL	7	4	4	9	Respins	Respins
9	BOCHES I ROBERT	5	2	9	9	Respins	Respins
10	CRAINIC D DANUT ALEXANDRU	9	4	9	8	Respins	Respins

Fig.3. The enlistment card and result registration

3. CONCLUSIONS

By using this database the following will be achieved:

- identification and checking of candidate data;
- correct assessment (not subjective) and in real time of all the candidates;
- data centralization for all test types;
- listing the candidates' performances and grades for each test;
- statistic reporting of the grades received by the candidates for each test.

Bibliography:

[1] Florescu Vasile – "Database - fundamental theoretical and practical", Infomega Publishing House, Bucharest 2002
[2] Eduard Koller, Monica Roşculeţ – "Programming in Access 97", Teora Publishing House, Bucharest 2002
[3] www.edu.ro

USING TAMSULOSIN FOR DISTAL URETERAL STONE CLEARANCE WITH OR WITHOUT SHOCK WAVE LITHOTRIPSY

MITRANOVICI Emil

Emergency Hospital Deva, ROMANIA

OBJECTIVES:

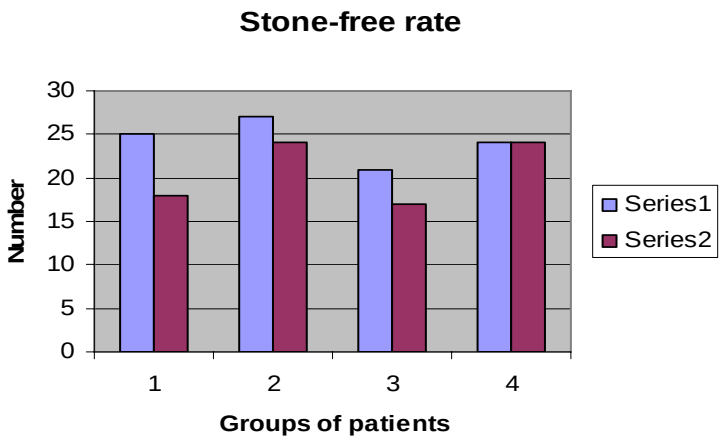
The aim of the present study is to evaluate whether there is a significance of using alpha-1-blocker (Tamsulosin) on stone clearance in patients with ureteral stones who underwent either shock wave lithotripsy (SWL), or were followed up with standard hydratation and anti-inflammatory treatment. The Alpha-1 blocker action to the alpha-1 receptor that is located in muscular cell in ureteral wall bladder wall and uretral wall that are relaxing effect and favorised to expulsion the stones. Ultrasound wave litotripsy using the high energy wave focused for disintegrated the urinary calculi without tisular lesion. In this study I use Siemens Lithostat lithotritor with two focalizer system-radiologic and ultrasonic.

Key words:

alpha-1-blocker, Tamsulosin, ureteral calculi,shock wave lithotripsy

1. MATERIAL and METHODS

In the present study, I investigated 97 patients-61 men and 36 women-who had distal ureteral stones. Patients were divided into the following groups: the first group consisted of 52 patients with stone less than 6 mm (range 2-6mm,on averge 4,1+/-0,06mm) and the second group consisted of 45 patients with stone greater than 6mm (range 6-15mm,on averge 8,9+/-0,14mm) who underwent SWL. The first group were randomly divided into two subgroups: patients of subgroup A(n=25) were followed up with standard regime of management: oral hydratatin and anti-inflammatory treatment; patients of subgroup B (n=27) were received Tamsulosin 0,4mg daily in addition to the standard gegime. The second group consisted of 45 patients with stones greater than 6mm who underwent SWL were randomly divided into two subgroups: those who did not-C subgroups(n=21)-and those who did receive Tamsulosin 0,4mg daily-subgroup D (n=24).Weekly all patients were reevaluated with plain abdominal X-rays and renal ultrasonography. Duration of investigation was 28 day or until expulsion of the stones.



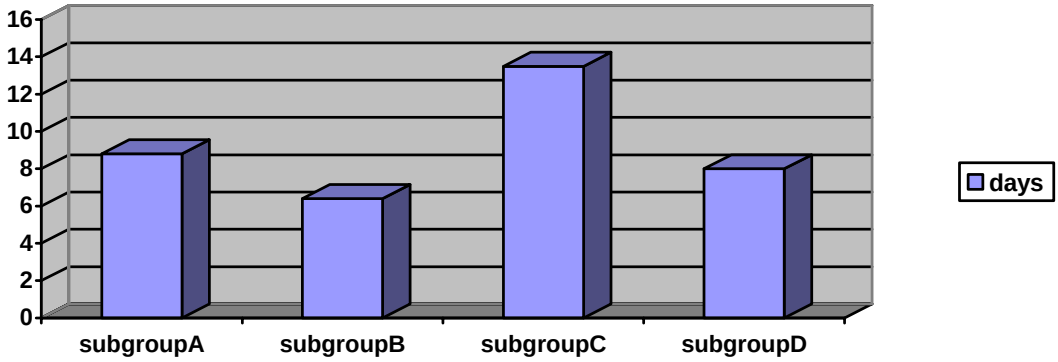
2. RESULTS

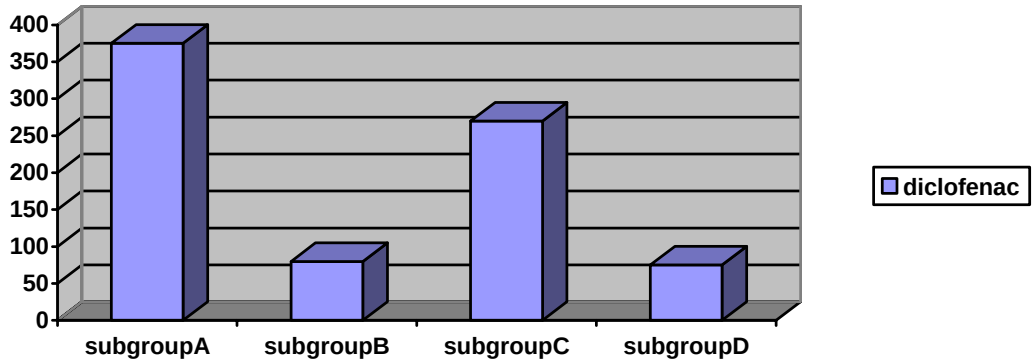
Of the 97 patients 83 (85,5%) become stone -free. The stone –free rate was: subgroup A 18 patients (72%), B 24 patients (88,9%), C 17 patients (80,9%) and D 24 patients (100%).

The best results were archieved in those who underwent SWL and additionally took Tamsulosin (subgroup D). The differences between the stone-free rates for subgroup C versus D (p=0,008) were statistically significant but subgroup B versus A (p=0,23) were statistically insignificant. The duration of expulsion of stones was on averge: 8,8 days subgroup A,6,4 days B,13,5 days C and 8 days D.

3. MEDIUM TIME IN DAY UNTIL EXPUSION OF STONES

Differences between subgroup A and B(p<o,oo1),were statistically significant, but C and D (p>0,05) were statistically insignificant. The mean anti-inflammatory consumption (diclofenac 50mg) during the treatment period was:375mg subgroup A, 80mg B, 270mg C and 75mg D.Difference between subgroup A and B(p<0,05),C and D(p<0,05) were statistically significant.





4. CONCLUSIONS

The results of the present study demonstrate a positive effect of using Tamsulosin in addition to the standard regime in shortening the time necessary for expulsion of the ureteral calculi also when combined with SWL. Also it was evident that using of Tamsulosin accompanied with less painful condition and reduced the consumption of anti-inflammatory.

BIBLIOGRAPHY

[1] Boja Radu :Chirurgia percutanata reno-ureterala;Edit.Leda-Muntenia 2000.
[2] Anderson K.R., Keetch D.W., Albala D.M., et al : Optimal therapy for the distal ureteral stone: Extracorporeal schock wave lithotripsy versus ureteroscopy. J.Urol, 1994 152.
[3] Cass A.S., Lee J.Y., Aliabadi H.: Extracorporeal shock wave lithotripsy and endoscopic management of renal calculi with urinary diversion.J.Urol, 1992, 148.
[4] Chaussy C.G., Fuchs G.J.: Current state and future development of noninvasive treatment of human urinary stones with extracorporeal shock wave lithotripsy J.Urol.,1989,141.
[5] Cole R.S., Shuttleworth K.E.D.: Is extracorporeal shock wave lithotripsy suitable treatment for lower ureteral stones? J.Urol., 1988, 62.
[6] Jenkins A.D., Lippert M.C., Wyker A.W., Gillenwater J.Y.: ESWL treatment of distal ureteral stones. Third World Congress on Endourology, New York, 1985.
[7] Nicolescu D., Simion C., Osan V. Boja R. : Litotritia extracorporeala in tratamentul litiazei reno-ureterale : indicatii si principii terapeutice. Rev.Med.Farm.Tg-Mures,1994,40.
[8] Osan V., Nicolescu D., Simion C.: Eficienta ESWL pentru calculii din ureterul inferior. Rev.Rom. Urol.vol1, nr1, 2002.
[9] Osan V., Simion C., Boja R., Golea O.:Metode adjuvante necesare cresterii indicatiei si eficientei litotritiei extracorporeale, Noutati Medicale, vol 8,nr. 3-4,2002.
[10] Sinescu I.: Urologie clinica, Editura Medicala Amaltea,1998.