



# 43rd CONGRESS AND CHAMPIONSHIP OF THE WORLD MEDICAL TENNIS SOCIETY

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Jurmala, Latvia  
August 17–23, 2013

Organizer  
LATVIAN MEDICAL TENNIS SOCIETY





## Dear doctors and visitors!

I have great pleasure and honor that you chose exactly Jurmala – the largest Baltic resort city and Pearl of Latvia – to organize 43rd Congress and Championship of the World Medical Tennis Society!

Jurmala is located just 25 km from Riga – capital of Latvia, close to the airport, on the bank of the gulf of Baltic Sea and big river Lielupe.

Our hospitable city is remarkable place for business meetings and conferences, unforgettable week-ends with family or friends, and, thanks to natural healing resources, for health recovery and inspiration. The city was deservedly recognized as European Destination of Excellence in Latvia, and received the status of the Healthy City.

With pleasure we await every participant or visitor of 43rd Congress & Championship of the World Medical Tennis Society. Come to Jurmala and enjoy the life of sport and culture, enjoy beach, sun and sea, enjoy the nature and architecture!

Jurmala – the place to meet, the place to rest, the place to come back again and again.



Yours Sincerely,  
Gatis Truksnis  
Chairman, Jurmala City Council



## Dear colleagues, friends

On behalf of the Latvian Medical Tennis Society (Latvijas Ārstu tenisa savienība, LĀTS, founded in 2001) I cordially invite you to participate in the annual 43rd WMTS meeting in Jurmala, Latvia, August 17-23, 2013.

Jurmala is the biggest resort city in the Baltic countries famous by its clean unspoiled sandy beach stretching along 33 km by the gulf of Riga and pine trees as well as old wooden resort architecture. I would like to recommend you to visit also our capital Riga founded in 1201, UNESCO World Heritage Site famous with medieval Old City and Art Nouveau/architecture. If you can afford more time to travel around Latvia you will find many interesting sightseeing places accordingly to your interests.

The main place for the tennis tournament is Tennis Centre Lielupe with 8 clay courts. There are 7 more clay courts in 2 other tennis clubs nearby. Depending on the number of participants 6 more clay courts can be arranged at Marupe Tennis School, the headquarters of the Latvian Medical Tennis Society. In case of rain we have enough indoor facilities for smooth running of the tournament. Shuttle buses will be provided between tournament hotels and tennis clubs.

The official hotel of the 43rd Congress and Championship of the WMTS is Hotel Jurmala Spa located in downtown Jurmala, 6 km from Tennis Centre Lielupe. Registration, opening ceremony, scientific sessions and presidents' meeting will take place there.

I do hope that you will enjoy your trip to Latvia and have successful week of tennis courts as well as find some time for sightseeing. On behalf of WMTS 2013 Organizing Committee I would like to welcome you all in Jurmala, Latvia.



Sincerely Yours,  
Egils Valeinis MD,  
President, WMTS and LMTS



## ORGANIZING COMMITTEE

Chair: Dr. Egils Valeinis

Committee: Prof. Andrejs Erglis, Dr. Dins Smits, Dr. Martins Pukse, Anzelika Legante

## SCIENTIFIC COMMITTEE

Chair: Prof. Andrejs Erglis

Committee: Prof. Uga Dumpis, Prof. Ojars Teteris, Dr. Vitalijs Zvirgzdins, Dr. Sandra Rozenstoka

## CONTACTS

Tournament Referee: Ivans Kuzovenkovs +371 28847597, kuzovenkovs@inbox.lv

Organizing Committee Chair: Egils Valeinis +371 29221050, egils.valeinis@latnet.lv

**Please note! Printout version of tournament draws and schedules will be available at Hotel Jurmala Spa registration desk**

You are welcome to see the updated tournament information, draws and schedules at [www.lats.lv/wmts2013](http://www.lats.lv/wmts2013)

Password: mccampbell



## GENERAL INFORMATION

### The Republic of Latvia

Founded in 1918

Restored independence in 1991

Joined the European Union in 2004

Location: North-Eastern Europe, on the coast of the Baltic Sea

Area: 64,589 km<sup>2</sup> (24,938 square miles)

Total population: 2 100 000

Capital city: Riga (700 000 inhabitants)



### Jurmala

Located at the gulf of Riga (the Baltic Sea)

The largest resort city in the Baltic States

Territory: 100 km<sup>2</sup> (the second largest city in Latvia by area)

Population: 55 000

Protected territory: 3 493 hectare (National park and Nature park, eco-trails)



### How to get to Jurmala

#### From the airport:

15 km from the international airport „Riga” (11 min by bus/car)

By bus: (daily 5 a.m. – midnight with stops at the hotels in Jurmala, ticket 3 EUR)

By taxi: (20 EUR)

#### From Riga Center:

By train/bus/car: 20 km from the capital (30 min)

By boat: daily from Riga in summer season (~2h)

By bicycle: bicycle route from Riga to Jurmala centre (30 km)



### The Beach

33 km long white-sand seashore

3 beaches with the eco-label of the Blue Flag

Bicycle routes along seaside



### Architecture

Significant and unique culture heritage:

- 14 historical culture centres
- 408 buildings are architecture monuments
- More than 4000 buildings correspond to historical building of city
- Old wooden resort architecture (end of the 19th century – beginning of the 20th century)
- 8 museums (also an open-air museum)



**Jurmala tourism information – [www.tourism.jurmala.lv](http://www.tourism.jurmala.lv)**





## VENUES

### Hotels:

Hotel Jumala Spa, Jomas iela 47/49, Jūrmala  
Lielupe Hotel, Bulduru prospekts 64, Jūrmala  
Baltic Beach Hotel, Jūras iela 23/25, Jūrmala

### Tennis Clubs:

Tennis Centre Lielupe, Oskara Kalpaka prospekts 16, Jūrmala  
Tennis Club Jūrmala, Vikingu iela 3, Jūrmala  
Tennis Club Concept, Vienības prospekts 36, Jūrmala  
Mārupe Tennis School, Mazcenu aleja 6a, Jaunmārupe

### Social:

LIDO Recreation Centre, Krasta iela 76, Rīga  
Havana Lounge Club, Turaidas iela (at the Beach), Jūrmala



## HOTELS

### Hotel Jūrmala Spa

Hotel Jūrmala Spa is a place where to enjoy the unforgettable relaxation, to escape from daily stress and to gain inspiration for new ideas. It is located in one of Latvia's oldest and most picturesque resorts - Jūrmala and is just a couple of hundred meters from the golden beaches on the shores of the Gulf of Riga. Jūrmala in all times has been a popular place for recreation and health improvement, because its beautiful pine forests, golden sands and unforgettable beaches. An excellent resort is located in the heart of Jūrmala - Jomas Street - which is the main entertainment and shopping artery of the city. Things to enjoy: One of the Spa treatments for wellbeing, the unforgettable sunset and views over Jūrmala from "Seaside" bar, varied wine list, compiled by the Baltic's awarded sommelier of restaurant, relaxation in saunas and pools center "Wellness Oasis".

### Lielupe Hotel

Hotel Lielupe is located on one of the most privileged locations in Jūrmala – set amongst the forest of century old pine trees, just a few hundreds of meters away from Bulduri beach. Being one of the favorite beaches on the Baltic coast - it is a gateway for your perfect stay in Jūrmala. Due to its truly unique location – being close to the sea, and within proximity to main Jūrmala shopping and entertainment area.

### Baltic Beach Hotel

Baltic Beach Hotel – 5\* SPA hotel, which is located in a sea resort Jūrmala, on the Baltic sea coast and surrounded by pine forest. The unique location in the dune area lets you enjoy peaceful relaxation, although it is only a few steps away from the heart of Jūrmala – Jomas Street.



- ❶ Hotel Jūrmala SPA
- ❷ Baltic Beach Hotel
- ❸ Lielupe Hotel
- ❹ Tennis Club Concept
- ❺ Tennis Club Jūrmala
- ❻ Tennis Centre Lielupe
- ❼ Havana Lounge Club



## TENNIS CLUBS

### Tennis Centre Lielupe

Tennis Centre Lielupe is the largest base of tennis in Latvia. The Tennis Centre features five indoor and eight lighted outdoor tennis courts. Tennis Centre Lielupe pro-shop, which is located inside the main entrance, features racquets, apparel, shoes, accessories, and stringing services for players of all ages and ability. Various national and international tournaments and championships are held in here. This is the home center for Latvian professional tennis players.

If you love tennis, Tennis Centre Lielupe has something to offer every tennis enthusiast.

### Tennis Club Jūrmala

Tennis Club Jūrmala features four clay courts within walking distance from Tennis Centre Lielupe.

### Tennis Club Concept

Concept is a modern and comfortable place for relaxation and sports within Jūrmala, located at the bank of Lielupe. The tennis center provides 7 tennis courts from which 4 are hard courts and 3 are clay courts.

### Tennis School of Marupe

Tennis School of Marupe, located in Jaunmarupe is only 15 km away from Riga center, either Jūrmala center. This Tennis Center provides 10 tennis courts from which 4 are hard courts and 6 are clay courts.

Tennis School of Marupe is perfect for enjoying tennis with friends and family. There is a shop, that features racquets, apparel, shoes, accessories, and stringing services for players of all ages and ability. Café provides different kind of food varieties and Fitness Club various types of training, like gym, aerobics and others. Club also offers sauna and jacuzzi.

Technically equipped Conference room and good catering service allows to organize various kind of events at Tennis School of Marupe.



- 8 Tennis School of Marupe
- 9 Lido Recreation Centre



## SOCIAL

### Hotel Jūrmala Spa

#### Opening Ceremony & Reception

#### Restaurant Jūrmala

Restaurant „Jūrmala” in Hotel Jūrmala Spa invites you to spend a relaxing evening in a warm atmosphere together with your friends. Restaurant international cuisine menu includes delicious and healthy meals for any taste. For meals taste perfection we offer a wide selection of wines compiled by the Baltic's awarded sommelier of our restaurant.

At restaurant terrace can enjoy the view of the most well-known promenade – Jomas Street.

**Dress Code: Casual**

### LIDO Recreation Centre

#### National Evening

It is one of the most attractive public catering enterprises in the world and one of the most favourite places of family recreation in Riga. The Centre is characterized by a Latvian environment, tasty and various dishes, LIDO beer, live music every evening!

The main building of the LIDO Recreation Centre is one of the biggest and most beautiful log buildings in Europe. The territory of the Centre with the spacious catering complex, parking lot for visitors and the Amusement Park is carefully greened and decorated, and it occupies almost 5 hectares.

We welcome you to this uniqueness Centre to feel Latvia by tasting, seeing, smelling, touching and hearing it.

**Dress Code: Casual**

### Havana Lounge Club

#### Farewell Dinner

Havana Lounge Club is a luxury resort complex on the beach in Dzintari offering beach, bar & restaurant facilities and a special entertainment program.

During the day time Havana Club Lounge offers its clients the sunbathing and relaxation facilities – beach beds, umbrellas, swimming pool, shower, storage boxes and full high-quality service in the bar & restaurant, as well as SPA services.

Havana Lounge Club offers pleasant atmosphere of the European high class sea resort, high quality service and a splendid view onto the sunset in the sea.

Live music, see and sunset will meet you on this Farewell Dinner.

**Dress Code: Smart Casual**

## MAIN PROGRAM

DATE	TIME	EVENT	SITE
<b>SATURDAY</b> <b>August 17</b>	<b>09:00 – 19:00</b>	Registration	Hotel Jurmala Spa
	<b>09:30 – 18:00</b>	Tennis Practice	Tennis Centre Lielupe
	<b>19:00 – 23:00</b>	Opening Ceremony & Reception	Hotel Jurmala Spa
<b>SUNDAY</b> <b>August 18</b>	<b>08:00 – 20:00</b>	Tennis Competitions	Tennis clubs
	<b>08:00 – 18:00</b>	Nations' Cup Team Registration	Tennis Centre Lielupe
	<b>19:00 – 21:00</b>	Scandinavian Scientific Session	Hotel Jurmala Spa
<b>MONDAY</b> <b>August 19</b>	<b>08:00 – 20:00</b>	Tennis Competitions, Nations' Cup	Tennis clubs
	<b>09:00 – 17:00</b>	Scientific Program	Tennis Centre Lielupe
<b>TUESDAY</b> <b>August 20</b>	<b>08:00 – 18:30</b>	Tennis Competitions, Nations' Cup	Tennis clubs
	<b>09:00 – 17:00</b>	Scientific Program	Tennis Centre Lielupe
	<b>20:00 – 23:00</b>	National Evening	LIDO Recreation Centre
<b>WEDNESDAY</b> <b>August 21</b>	<b>08:00 – 20:00</b>	Tennis Competitions, Nations' Cup	Tennis clubs
	<b>09:00 – 17:00</b>	Scientific Program	Tennis Centre Lielupe
	<b>18:00 – 20:00</b>	Presidents' Meeting (delegates)	Hotel Jurmala Spa
	<b>20:00 – 22:00</b>	Presidents' Dinner (delegates & spouses)	Hotel Jurmala Spa
<b>THURSDAY</b> <b>August 22</b>	<b>08:00 – 20:00</b>	Tennis Competitions, Nations' Cup	Tennis clubs
	<b>09:00 – 17:00</b>	Scientific Program	Tennis Centre Lielupe

<b>FRIDAY</b> <b>August 23</b>	<b>08:00 – 17:00</b>	Tennis Competitions, Nations' Cup	Tennis clubs
	<b>09:00 – 11:00</b>	Scientific Program Summary and Closing	Tennis Centre Lielupe
	<b>17:00 – 18:00</b>	Awards Ceremony	Tennis centre Lielupe
	<b>20:00 – 23:00</b>	Farewell Dinner	HAVANA Lounge Club



## Scientific Program

### VENUE:

Hotel Jurmala Spa, Jomas iela 47/49, Jūrmala  
Tennis School of Marupe, Mazcenu aleja 61, Jaunmārupe

DATE	TIME	SESSIONS	SITE
<b>SUNDAY</b> <b>August 18</b>	<b>19:00 – 21:00</b>	<b>Scandinavian Scientific Session</b> Chairman: Ann Stokland, MD <b>19:00 – 19:25</b> Endocrine doping among athletes / Staffan Edén, University of Gothenburg (Sweden) <b>19:30 – 19:55</b> Alzheimer disease-diagnos and treatment / Mikael Nornholm, University of Skane (Sweden) <b>20:00 – 20:25</b> Stroke / Sigrun Braekken (Norway) <b>20:30 – 21:00</b> Patient safety / Christina Raner, Sahlgrenska University Hospital (Sweden)	Hotel Jurmala Spa, Hall Aspazija
<b>MONDAY</b> <b>August 19</b>	<b>09:00 – 17:00</b>	<b>From Health Promotion to Science</b> Abstracts and Scientific Presentations	Tennis Centre Lielupe
<b>TUESDAY</b> <b>August 20</b>	<b>09:00 – 11:00</b>	<b>Oral Presentations</b> Moderators: Andrejs Erglis, Uga Dumpis <b>09:00 – 09:15</b> Stem Cell Therapy and its Clinical Application in Cardiology – Latvian Centre of Cardiology Experience / Andrejs Erglis (Latvia) <b>09:15 – 09:30</b> Intraarticular Injections in Treatment of Knee Osteoarthritis: Clinical Results with Combined Antioxidant and Viscosupplement Product / Valdis Goncars (Latvia) <b>09:30 – 09:45</b> Bone Marrow Mononuclear Cell Separation Yield in Osteoarthritis Patients / Eriks Jakobsons (Latvia)	Tennis Centre Lielupe

		<b>09:45 – 10:00</b> Bone Marrow Derived Mesenchymal Stem Cell Therapy for The Hip and Knee Osteoarthritis: Safety and Short-term Clinical Results / Valdis Goncars (Latvia) <b>10:00 – 10:15</b> Risk Factors for The Health and Life of The Inhabitants of Latvia (Riga) in Aspect of Morphologist (Forensic Pathologist) / Ojars Teteris (Latvia) <b>10:15 – 10:30</b> Tennis Related Stress Fractures of The Lower Spine / Agate Ziverte (Latvia) <b>10:30 – 10:45</b> Prevention of Infectious Diseases in Competitive Sport / Uga Dumpis (Latvia) <b>10:45 – 11:00</b> Sudden Death in Young - Causes and Morphological Finding: Data from Centre for Disease Prevention and Control of Latvia, 2011 / Valters Stirna (Latvia)	
	<b>13:00 – 17:00</b>	<b>Posters</b> Efficacy and Safety of Transcutaneous Vagus Nerve Stimulation (tvNS) in Tinnitus / Jukka Ylikoski (Finland) Obesity and Coronary Heart Disease in The Population of Latvia (Riga). Morphological Studies / Ojars Teteris (Latvia) Ultraviolet radiation: effects on the skin and photoprotection / Aneta Szczerkowska-Dobosz (Poland)	Tennis Centre Lielupe
<b>WEDNESDAY</b> <b>August 21</b>	<b>09:00 – 17:00</b>	<b>Baltic Scientific Symposium</b> Abstracts and Scientific Presentations	Tennis Centre Lielupe

<b>THURSDAY</b> <b>August 22</b>	<b>09:00 – 17:00</b>	<b>Medicine of the Future for Today</b> Abstracts and Scientific Presentations	Tennis Centre Lielupe
<b>FRIDAY</b> <b>August 23</b>	<b>09:00 – 11:00</b>	<b>Scientific Program</b> <b>Summary and Closing</b>	Tennis Centre Lielupe

## ABSTRACTS

### Bone Marrow Mononuclear Cell Separation Yield in Osteoarthritis Patients.

Jakobsons E<sup>1</sup>, Goncars V<sup>2</sup>, Erglis A<sup>3</sup>

<sup>1</sup> Cell Transplantation Centre, Pauls Stradins Clinical University Hospital, Latvia

<sup>2</sup> Hospital of Traumatology and Orthopaedics, Latvia

<sup>3</sup> Latvian Centre of Cardiology, Pauls Stradins Clinical University Hospital, Latvia

**Introduction.** Stem cell therapy offers a promising approach to the regeneration of damaged cartilage and other diseases. Bone marrow derived mononuclear cells (BM-MNCs) are widely used in various clinical trials.

There is ongoing clinical trial in our hospitals where we use BM-MNCs for osteoarthritis treatment.

Cells count matter if we look from perspective of clinical application and clinical efficacy. Most known and documented method to harvest the BM-MNC is iliac crest puncture. We used a new approach to BM-MNCs harvesting – separation of the collected blood/bone marrow and the bone parts from hip and knee arthroplasties. In this part of the trial research we compare BM-MNC yield between iliac crest puncture and material harvested during joint replacement procedure from osteoarthritis patients.

**Methods.** Bone marrow were collected by iliac crest puncture, during joint replacement by CellSaver system and bone parts - crashed femoral head.

Bone marrow mononuclear cells were isolated using Ficoll density gradient centrifugation. Cell count and viability were detected using flow cytometry.

Statistical differences were analyzed using t-tests. A p-value of 0.05 or less was considered statistically significant. All data was shown as mean +/- standard deviation.

**Results.** Initial average volume of bone marrow aspirate for iliac crest puncture group was 43 ml and 457 ml for joint replacement group respectively. BM-MNCs yield after gradient centrifugation for iliac crest puncture group patients (n=7) was 28.4 +/- 20x10<sup>6</sup> and for joint replacement group patients (n=7) 92.3 +/- 20x10<sup>6</sup> respectively. Cell viability after gradient centrifugation for iliac crest puncture group patients was 75,8 +/- 15,8 % and for joint replacement group patients 72,2 +/- 15,7 %.



## Conclusions.

1. Iliac crest puncture is most common method for bone marrow harvest. Harvesting of biological material during joint replacement procedure can benefit in higher MNC yield. However, bone marrow harvesting method is associated with individual patient condition.
2. Methodology of harvesting of biological material during joint replacement procedure should be adjusted in terms of more effective cell harvesting.
3. The femoral head not significant source of BM-MNCs due to low extracted cell count.
4. No statistically significant ( $p = 0.67$ ) difference of cell viability were observed between both groups.
5. Larger trial groups are necessary for more sophisticated statistical analysis.



## Bone Marrow Derived Mesenchymal Stem Cell Therapy for The Hip and Knee Osteoarthritis: Safety and Short-term Clinical Results.

Jakobsons E<sup>1</sup>, Goncars V<sup>2</sup>, Kalnberzs K<sup>2</sup>, Erglis A<sup>3</sup>

<sup>1</sup> Cell Transplantation Centre, Pauls Stradins Clinical University Hospital, Latvia

<sup>2</sup> Hospital of Traumatology and Orthopedics, Latvia

<sup>3</sup> Latvian Centre of Cardiology, Pauls Stradins Clinical University Hospital, Latvia

**Introduction.** The leeding method in treatment of large joint osteoarthritis in last five decades was the total joint replacements. This method has shown very good results in patients over the age of 65. However the same results could not be achieved in younger patients. The long term durability of the total joint prosthesis is still an unsolved problem. The ability of mesenchymal stem cells (MSCs) to differentiate into chondrocytes could be used in the cartilage repair and osteoarthritis treatment. This biological solution to the biological problem could offer a good treatment option for the younger patient group. Multipotential (MSCs) is mainly acquired from the bone marrow (BM-MNC). In the literature we find some studies about the use of (BM-MNC) in the treatment of isolated cartilage lesion and some case reports about the (BM-MNC) use in osteoarthritic patients. The analysis of larger patient cohorts has not been found.

**Aim.** The aim of this study is to obtain the safety of intraarticular introducing of (BM-MNC) and the clinical results in the short-term (6 Months ) period.

**Material and methods.** The target group (14 patients) has hip or knee osteoarthritis in stages 2 and 3 according to Kallgren-Lawrenc classification with one or more affected joints. These were divided in two therapy groups. The therapy group 1 (5 patients) had more than one affected joint. The hip or knee arthroplasty was performed on the joint with higher grade of deformation. During the joint arthroplasty, evacuated blood with the bone marrow will be used to separate the mononuclear cells. The therapy group 2 (8 patients) has one joint affected from osteoarthritis and the source for the BM-MNC was the bone marrow aspirate from iliac crest. In both groups the isolated BM-MNC was injected under fluoroscopic control in the osteoarthritic joint.

For the evaluation of clinical results, *The Oxford Knee and Hip Score*, *Harris Hip Score* and *KSS Knee Score* have been used. The radiological assessment was based on the digital calibrated X-Rays and MR investigations.



**Results.** No side effects were found in all the patients after BM-MNC injections in the osteoarthritic joints. The average implanted MNC cell count was 30,93 mil. in group 1 and 41, 32 mil. in group 2. Overall improvement in treated hips after one month was 15,72 % and the knees 22,25%. After 3 Months period hips had improvement 16,23% and knees 17,00% No progression of further degenerative changes were found through calibrated X-Rays and MRI. However, to arrive at comprehensive and plausible statistical analysis, the number of patients in the target group must be enlarged. The correlation of injected number of cells and clinical outcome of the patient is still in a research process and will be reported in the following presentations.

#### Conclusions.

1. The intraarticular injection of BM-MNC seems to be so far a safe manipulation with no side effects in short-term period.
2. The clinical results in short-term period are promising. However, a larger number of patients and longer observation period is needed to evaluate the clinical benefits for the treatment of osteoarthritis in hip and knee joints.



## Tennis Related Stress Fractures of The Lower Spine.

Valeinis E, Mikijanskis R, Ziverte A

Neurosurgery Clinic, Pauls Stradins Clinical University Hospital, Latvia

The incidence of stress fractures in athletes ranges from 1.4% to 4.4% (2% in men, and 7% in women). They occur in young patients, with a history of repetitive activity and are differentiated from acute fractures by the absence of an acute traumatic event.

The stress fracture is an unusual cause of low back pain in athletes. A potential explanation is vertical concentration of the stresses of the body's forces dissipating from the spine to the sacrum, which imposes unusual stress on normal bone. In tennis, it seems to result from the repetitive movements involved in baseline strokes and the frequent changes in direction. The clinical findings are characterised by lumbar and/or sacral pain, of insidious onset, with no history of trauma, and can occasionally irradiate to the gluteus region or the leg. The onset of pain is usually only after sports activity, and is located near the area of the bone involved, but, as time goes on, the pain can become continuous, limiting sports activity. Neurological tests are usually normal, but, in rare cases, they may reveal signs of irritation of sacral nerve roots.

Radiographs of the lumbar and sacral region may be normal. Computed tomography imaging of the lower spine and sacrum is the first choice for diagnostics. Patients with the lower spine stress fractures improve quickly with rest and no sports activities for four to six weeks. Administration of analgesics may help the patient to comply with the physiotherapy programme. Gradual return to activity is crucial to allow complete healing of the injury, and this should be emphasized to athletes, as they are likely to return to sport too early.



## Obesity and Coronary Heart Disease in The Population of Latvia (Riga). Morphological Studies.

Teteris O<sup>1</sup>, Nevidovska K<sup>2</sup>, Vamze J<sup>2</sup>, Grauss G<sup>2</sup>, Erglis A<sup>3</sup>

<sup>1</sup> Riga Stradins University, Latvia

<sup>2</sup> State Centre for Forensic Medical Examinations, Latvia

<sup>3</sup> Research Institute of Cardiology, University of Latvia, Latvia

**Introduction.** As one of the most often diseases coronary heart disease essentially impact health and endanger life of the inhabitants of Latvia, diminish length of life and impact life quality.

**Goal.** To determine relatively prevalence of heart diseases among inhabitants of Latvia (Riga), connectedness with associative factors: obesity, hypertension a.o.

**Materials and methods.** In the framework on the bases of 1500 autopsies and histological examinations there is established data base on occurrence of cardiovascular diseases in Latvian (Riga) population of years 2008-2010. Further processing of data was made with programme SPSS (Statistical package for social sciences for Windows 17.0 ASV). In the data base were enlisted the following parameters: weight, height, body mass index (BMI) = weight (kg)/ height (m<sup>2</sup>), by assuming that normal BMI is 18,5-24,99, with excessive weight - 25-29,99, above 30 – as obesity. Pathological changes in heart are registered by determining heart mass, symptoms of myocardium hypertrophy, stenosis of coronary artery large branches in cross section (patients are divided in 4 groups – in the group I there are enclosed patients with stenosis up to 30%, group II – with stenosis from 30 – 50 %, group III – with stenosis from 50 – 70%, IV – with stenosis above 75%.); changes in myocardium (infarction; peri-vascular, diffuse cardio sclerosis, post-infarction (large-focus) cardio sclerosis, symptoms of heart obesity.

**Results.** Most early stenosis of coronary artery is stated in age of 20 – 29 years – in one case with stenosis up to 30%, in two cases with stenosis from 30 – 50%. Stenosis of coronary artery increase rapidly starting from age of 40 – 49 years by reaching the highest indices in age of 60 – 69 for men and in age of 70 – 79 years for women. Stenosis from 50 – 75% was observed in age of 30 – 39 years. Post-infarction cardiosclerosis most early is stated in age of 30 – 39 years both for men and for women, but most often for men in age of 60 – 69 years, for women in age of 70 – 79 years. In combination with hepatic steatosis CHD increase till changes of BMI and reach its maximum in age of 50 – 59 for men and in age of 70 – 79 for women.

**Conclusions.** With excessive weight and CHD most often suffered men in age of 50 – 59 years, women – in age of 70 – 79 years. In the material of studied population of Latvia (Riga) in total it can be evaluated that rate of morbidity with CHD is observed more for men and in more morphologically expressed forms at approximately 10 year earlier age which can also be one of reasons for considerable difference of longevity of life between women and men in Latvia.





## Intraarticular Injections in Treatment of Knee Osteoarthritis: Clinical Results with Combined Antioxidant and Viscosupplement Product.

Goncars V<sup>1,2</sup>, Pinkis R<sup>2</sup>

<sup>1</sup> Hospital of Traumatology and Orthopedics, Latvia

<sup>2</sup> University of Latvia, Latvia

**Introduction.** Osteoarthritis (OA) is a very common joint disorder and its prevalence is increasing. Viscosupplementation (VS) is used for more than 20 years and is recommended in the treatment of OA. VS products differ in hyaluronic acid (HA) origin, HA concentration, HA molecular weight, HA chemical modification, rheological properties, dosing regimens, claims of safety and efficacy and residence time into the joint. The presence of free radicals in the osteoarthritic joint leads to HA degradation and resorption in the joint.

Synolis® V-A was designed to have a high capacity to scavenge and neutralize free radicals thanks to its unique [HA / sorbitol] combination.

The aim of the study was to assess the safety, the pain reduction and mobility recovery properties on patients with Kallgren –Lawrenc stage 2-4 Knee Joint osteoarthritis treated with intraarticular Synolis injections.

**Methods.** 26 patients with symptomatic KOA Kallgren –Lawrenc stage 2-4 were included in a 26 weeks prospective study. Mean age 61 +/- 39, KL (grade /N): II/14; III/15; IV/1. Two patients were lost from the follow up. Treatment regimen consisted of 3 IA injections of 2 ml of Synolis® V-A weekly apart. Pain and function (WOMAC scale, walking pain, physician global assessment, WOMAC A and WOMAC stiffness) were obtained at W0, W1, W2, W13 and W26. Treatment satisfaction and amount of responding patients was also evaluated at the end of the follow up period.

**Results.** At W26, Walking pain improved for 0.9 points average (5 point scale), WOMAC A (10 point scale) improved for 3.9 points average. Womac stiffness (5 point scale) improved for 1.6 points average. At W26, 75% of the patients considered the treatment as effective to extremely effective and 55% considered it extremely effective. 3 patients had no positive effect after the treatment. On two of them the meniscus injury was proved with MR. On the one patient with grade 4 osteoarthritis the knee arthroplasty was performed in W18.

**Conclusion(s).** The treatment course of 3 Synolis® V-A injections in most cases leads to fast and significant pain reducing.

The effect of Synolis® V-A maintains for at least 26 weeks.

No major side effects were observed.

The clinical benefits for the use of this treatment for the patients with high grade osteoarthritis or meniscus lesion were not being found.



## Risk Factors for The Health and Life of The Inhabitants of Latvia (Riga) in Aspect of Morphologist (Forensic Pathologist).

Teteris O

Riga Stradins University, Latvia

**Introduction.** Statistics of death cases and pathomorphologic alterations in cases of sudden death testify on living style of the population and risk factors for health and life of the inhabitants.

**Materials and methods.** In the framework of State Research programme on the bases of autopsies and histological examinations there is established data base on occurrence of cardiovascular diseases and its associative factors in cases of violent and sudden death in Latvian (Riga) population, as well as by using archive data of State Forensic Medical Expertise centre of years 2008-2010. During the study there was made epidemiological analyses for histological confirmed 1478 sudden and violent death cases of autopsies together with toxicological analyses.

**Discussion.** For many years as essential risk factor for the health of the inhabitants of Latvia is indicated excessive usage of alcohol, smoking, eating habits and sedentary lifestyle, stress, environmental pollution. Point of attention is short average life time of men in Latvia and relatively great difference between average life time of women and men. The above mentioned risk factors manifest in statistics of kind of death as well as in the pathologies of the inhabitants. Eating habits and sedentary lifestyle, stress and smoking are reasons of obesity, hypertension and thus arising coronary heart disease and blood vessel diseases. In attention of forensic pathology mainly appear cases of sudden death connected with acute poisoning, with traumas obtained due to usage of alcohol, drowning or accidents connected with impact of high or low temperature, as well as due to cardiac, liver and other pathologies caused by chronic alcoholism. Social stress and alcoholism are most often risk factors for the high suicide indices in Latvia.

**Results.** The stated pathomorphologic alterations of the inhabitants of Latvia (Riga) are corresponding to the medical statistic indices and to the results obtained during the clinical studies.

**Conclusion.** The studies indicate, that pathological alterations and impact of risk factors start to manifest already in early age and healthy life style must be introduced already in pre-school. Usage of alcohol associated with high traumatism, more often accidents, suicides and chronic alcoholism seems to be important risk factors for great difference between average life time of women and men in Latvia.



## Prevention of Infectious Diseases in Competitive Sport.

Dumpis U

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Sudden infectious disease can significantly affect sports performance and hamper the ability to exercise for considerable time period. Acute viral respiratory illness is not only the self-limited episode of fever but also the leading cause of exacerbation of bronchial asthma that is quite common among sportsmen. Acute streptococcal pharyngitis or persistent rhinosinusitis can affect ability to exercise for long time period. Another common problem is staphylococcal food poisoning, viral gastroenteritis and travellers diarrhea. These conditions affect not only ability to perform but also change blood electrolyte and fluid balance that can lead to cramping or muscle weakness and even affect consciousness. Skin and soft tissue conditions, like foot mycosis or staphylococcal abscesses are quite frequent in sportsmen. Lastly, travel-associated diseases are sometimes very dangerous and good quality local information is not always available.

Fortunately, most of the above mentioned infectious diseases are preventable. Some by behavioural change, some by additional infection control measures and some even by vaccination. Ways of preventing these conditions will be discussed in the presentation.



## Efficacy and Safety of Transcutaneous Vagus Nerve Stimulation (tVNS) in Tinnitus.

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**Objectives.** It was recently demonstrated in the rat tinnitus model that tinnitus-related maladaptive neuronal plasticity might be reversed by a combination of vagal nerve stimulation (VNS) and sound. A clinical pilot study in tinnitus patients using implanted VNS paired with sound showed promising results as well. It has been demonstrated by functional MRI and EEG recordings that transcutaneous VNS (tVNS) of the auricular branch of the vagus nerve (ABVN) or Arnold's nerve activates the central vagal pathways in a similar way as implanted VNS. In addition, we have recently shown by magnetoencephalography recordings (MEG) that the auditory cortical responses can be modulated by the application of tVNS. This suggests an access to the auditory system through the vagus nerve. The aim of this study was to investigate therapeutic efficacy and safety of tVNS in tinnitus patients.

**Methods.** The left ABVN of 20 patients with moderate or severe tinnitus was stimulated with tVNS continuously for 60 min per day for five days. Customized sound (music) therapy was applied simultaneously. Tinnitus loudness and annoyance (VAS), tinnitus handicap inventory (THI) and mini-TQ were registered before and after treatment. WHO-5-point questionnaire was used for the evaluation of general well-being. Heart rate was continuously monitored during the treatment sessions.

**Results.** tVNS seems to consistently reduce the subjective loudness and annoyance of tinnitus. The average scores of THI and mini-TQ were lowered by 20 and 5 points, respectively. Furthermore, tVNS seems to have a clearcut beneficial effect on tinnitus-related Distress, increasing significantly the patients' coherence and subjective well-being. Heart rate monitoring during the tVNS treatments showed no cardiac or circulatory effects (e.g. bradycardia) in any of the patients. No adverse effects were observed during subsequent treatments.

**Conclusion.** A combination of tVNS and tailored ST seems to reduce the severity of subjective tinnitus sensation and the tinnitus-associated distress in tinnitus patients. It is also worth noting that no adverse effects were observed during the tVNS treatments.



## Ultraviolet radiation: effects on the skin and photoprotection.

Szczerkowska-Dobosz A

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Beneficial effect of solar radiation on humans has been well known since thousands of years. Natural sunlight is responsible for the vitamin D synthesis and artificial sources of ultraviolet (UV) light are widely used in the treatment of many medical conditions. Exposition to (UV) light has rapidly grown in the last decades due to socioeconomic changes, longer life expectancy, thinning of the ozone layer and overuse of indoor tanning for aesthetic purposes. Excessive UV light exposure causes acute (erythema, pigmentation) and chronic skin sun-damage, presenting as prematurely aged skin (photoaging) and photocarcinogenesis. UV radiation is a major risk factor for most skin cancers and skin melanoma. Moreover, exposure to UV may cause photodermatoses - a heterogeneous group of diseases primarily caused or exacerbated by sunlight as well as photosensitivity presenting as photoallergic or phototoxic skin reaction due to different endogenous or exogenous factors.

Prevention of UV side-effects is a lifelong task and includes photoprotection (sunscreens, sun-avoiding strategies) and use of antioxidants.

Since tennis is a mainly outdoor activity players should be aware of sun exposure danger. Short-term sun provoked complications may affect their performance while chronic excessive exposure to sun light may increase individual risk of photoaging and photocarcinogenesis.



## Stem Cell Therapy and its Clinical Application in Cardiology – Latvian Centre of Cardiology Experience.

Erglis A

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There is a wealth of preclinical and clinical data showing the safety, feasibility, and efficacy of cell therapy in patients with cardiovascular disease. However, stem cell delivery remains a major challenge in the development of cardiac stem cell therapy strategies. Since 2008 there are many ongoing clinical trials in Latvia: transplantation of autologous bone marrow mononuclear cells (BMMC) for patients with acute myocardial infarction, chronic heart failure (including pediatric dilated cardiomyopathy) and diabetes mellitus using intracoronary delivery or injections in branches of splenic artery during balloon angioplasty.

We performed stem cell therapy in more than 100 patients with acute myocardial infarction. The follow-up is ongoing. Cell therapy was performed in 7 patients with pediatric dilated cardiomyopathy. The average basal ejection fraction (EF) was 33.5%. EF increased to 54% ( $p=0.00154$ ) in 6 months and 54.5% ( $p=0.00315$ ) at 1 year. We have performed stem cell therapy in 14 patients with coronary artery disease and Type 2 diabetes for more than 5 years, who were receiving oral antihyperglycemic therapy. We aspirated 200 ml bone marrow via iliac crests and isolated BMMCs, which were then infused to the pancreas directly via branches of splenic artery or superior pancreaticoduodenal artery during occlusion of the distal lumen using over the wire balloons. Patients were followed-up for 3 months post-procedure. The long-term follow-up is ongoing. The cell therapy was performed without any periprocedural complication. During the 3-month follow-up, none of the patients had serious adverse events. 10 patients (91%) showed an improved glycemic control, all patients remained insulin independent. There was a significant decrease in HbA1c from 8.3% at baseline to 7.4% during 3 months follow-up ( $p=0.022$ ) and 9 (81%) of the patients had HbA1c below 7% by 3 months.

Further randomized controlled clinical trials will be required to confirm these findings.







## Sudden Death in Young - Causes and Morphological Finding: Data from Centre for Disease Prevention and Control of Latvia, 2011.

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**Introduction.** Despite improvement in early detection of risk factors of sudden cardiac death (SCD), rate of events remains dramatically high. Aim of our study was to analyze the cases of SCD and morphological finding on victims.

**Materials and methods.** We have analyzed data from data bases of State Centre for Forensic Medical examination of Latvia and Centre for Disease Prevention and Control of Latvia of year 2011 and National Registry of SCD. Analysis included individuals younger than age 35, victims were divided in four groups according to age: 0-2, 3-13, 14-21, 22-35 years old, places of events (public places – institutions, streets, sport complexes, home and health care system offices). We have analyzed death fixed by ambulance visits and morphological finding in forensic medicine centre: coronary heart disease, cardiomyopathies (hypertrophic [HCMP], dilatation [DCMP], arrhythmogenic), congenital heart diseases [CHD], intoxication and unexplained death.

**Results.** Ambulance visits in 2011 fixed 345 cases of death of patients younger than 35, from which 276 were male [M] and 69 were female [F]. Death at home was noted in 137 M and 40 F, on a street – 110 M and 20 F. In a other public places death was noted in 27 M and in 4 F. Two cases of SCD in both men and women were fixed by healthcare system offices. Unsuccessful resuscitation was noted in 53 M and 19 F. Proportion between M and W was: all death 80% men, on street and public places M 85.1%, at home M 77.4%.

Pathology	All (n)	Male (n)	Female (n)	Age (years old)			
				0 - 2	3 - 13	14 - 21	22 - 35
Coronary	5	5	0	0	0	0	5
Cardiomyopathies (All)	51	44	7	2	0	4	45
HCMP	23	20	3	2	1	5	15
DCMP	4	0	0	0	0	1	4
CHD	15	8	7	7	3	0	5
Intoxication (incl. ethanol)	21	18	3	0	0	2	19



In comparison with data from 2009-2010 decreased rate of death was observed generally, in HCMP and DCMP. Lower rate of death was observed in victims in public places and in younger groups, what can be explained with more active identification of cardiomyopathies and national algorithm on diagnostic and treatment strategy.

**Conclusions.** Despite of improvement on early diagnostic, rate of death in young people remains relatively high. Coronary problems occur more in patients closer to age of 35 years, but HCMP remains dangerous disease in all ages. SCD in young more often had been observed in men. Diagnostical algorithm may improve early detection of high risk and decrease mortality.



## The role of Standard Electrocardiography in early identification of Life – threatening Arrhythmias in Athletes : situation in 2010.

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Cardiovascular remodelling in the conditioned athlete is frequently associated with physiological ECG changes. Abnormalities, however, may be detected which represent expression of an underlying heart disease that puts the athlete at risk of arrhythmic cardiac arrest during sports. It is mandatory that ECG changes resulting from intensive physical training are distinguished from abnormalities which reflect a potential cardiac pathology. The present article represents the consensus statement of an international panel of cardiologists and sports medical physicians with expertise in the fields of electrocardiography, imaging, inherited cardiovascular disease, cardiovascular pathology, and management of young competitive athletes. The document provides cardiologists and sports medical physicians with a *modern* approach to correct interpretation of 12-lead ECG in the athlete and emerging understanding of incomplete penetrance of inherited cardiovascular disease. When the ECG of an athlete is examined, the main objective is to distinguish between physiological patterns that should cause no alarm and those that require action and/or additional testing to exclude (or confirm) the suspicion of an underlying cardiovascular condition carrying the risk of sudden death during sports. The aim of the present position paper is to provide a framework for this distinction. For every ECG abnormality, the document focuses on the ensuing clinical work-up required for differential diagnosis and clinical assessment. When appropriate the referral options for risk stratification and cardiovascular management of the athlete are briefly addressed.

Regular sports participation is encouraged by the medical community as part of cardiovascular prevention measures, because it improves fitness and reduces cardiovascular morbidity and mortality worldwide. A large proportion of the young population participates in competitive or recreational sports activity. The 12-lead electrocardiogram (ECG) is an established tool in the evaluation of athletes, providing important diagnostic and prognostic information on a variety of cardiovascular diseases which are associated with an increased risk of sudden cardiac death (SCD) during sports. Physicians are frequently asked to interpret an ECG in the setting



of cardiovascular evaluation of athletes. Standard criteria for defining the limits of normal (or variation of normal) ECG in the athlete remain to be determined. The interpretation of the athlete's ECG is often left to personal experience and usually made according to traditional ECG criteria used in the general (non-athletic) population.

Electrocardiogram changes in athletes are common and usually reflect structural and electrical remodelling of the heart as an adaptation to regular physical training (athlete's heart). However, abnormalities of athlete's ECG may be an expression of an underlying heart disease which carries a risk of SCD during sport. It is important that ECG abnormalities resulting from intensive physical training and those potentially associated with an increased cardiovascular risk are correctly distinguished.

Errors in differentiating between physiological and pathological ECG abnormalities may have serious consequences. Athletes may undergo expensive diagnostic work-up or may be unnecessarily disqualified from competition for changes that fall within the normal range for athletes. This is of particular relevance for professional athletes in whom disqualification from competitive sports has significant financial and psychological consequences. Alternatively, signs of potentially lethal cardiovascular disorders may be misinterpreted as normal variants of an athlete's ECG. A correct evaluation of 12-lead ECG patterns in the athlete and appropriate subsequent action has the potential to increase efficacy, accuracy, and cost-effectiveness of athlete's cardiovascular evaluation.

Some consider that physiological ECG changes overlap significantly with ECG abnormalities seen in the cardiovascular diseases which cause SCD in the young. The ECG has therefore been considered a non-specific and non-cost-effective tool for cardiovascular evaluation of athletes because of a presumed high level of false-positive results. This concept was based on few studies of small and selected series of highly trained athletes from a limited number of sports disciplines. The 25-year Italian experience with universal pre-participation screening has offered the unique opportunity to investigate ECG changes in large cohorts of athletes, engaged in a broad variety of sports activities with different and well-characterized levels of training and fitness. The currently available data allow an accurate redefinition of the spectrum of athlete's ECG patterns and raise the need for a revision of accuracy, utility, and cost-benefit analysis of the use of ECG in the cardiovascular evaluation of the athlete. In addition, there is growing experience of early and incomplete disease expression of the inherited cardiomyopathies and arrhythmias which usually have ECG changes as their initial presentation



## Healthy Alternatives Of The Mediterranean Diet In Latvia.

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The milestone of illness prophylaxis is a healthy lifestyle, which is composed of regular physical activity and a healthy diet. Following the Mediterranean diet for two years has been shown to have significant decrease in cardiovascular death by 9%, cancer by 6%, Parkinson's and Alzheimer's by 13%. This diet helps to control the perfect weight, improves lipid profile and diminishes the risk of diabetes. The Mediterranean diet consists of extra virgin olive oil, vegetables and fruit, wholegrain products, legumes, nuts and seeds, dairy products (with no other sources of fat other than milk fat), fish (at least twice a week), poultry, veal, pork in limited amount, and eggs — 0–4 per week. It is possible to adapt this kind of alimentation in the Nordic countries, but it is important to find products grown there with similar nutritional characteristics. Nowadays, fresh fruits and vegetables can be bought all year round, but it is essential to use seasonal products. In Latvia, at this point, attention should be brought to more efficient storage and conservation. We have a vast variety of legumes and cereals. The selection of dairy products should be bigger and of higher quality, because you rarely see local cheeses made in an artisanal manner at the marketplaces. There is good availability of saltwater fish in the cities, but in the countryside the only fish one can buy is salted and smoked, having exaggeratedly high amounts of salt. Consumption of meat and its products should be lowered to a maximum of three times per week. A special attention should be brought to game (such as deer), because it contains low levels of cholesterol and higher amounts of unsaturated fatty acids due to the alimentation of wild herbs. Unfortunately, there is a lack of good quality oil in Latvia, because no other product can be compared to the nutritious components of extra virgin olive oil and its effects on cardiovascular health. Consumption of high amounts of olive oil decreases the incidence of stroke by 41%. Education should be conducted widely to promote tradition and gastronomic heritage as a cultural aspect. Healthy lifestyle has to be visible to everyone at any time as a constant reminder of its importance.



## Long QT Syndrome induced Ventricular Arrhythmias and diagnostic Problems in Children.

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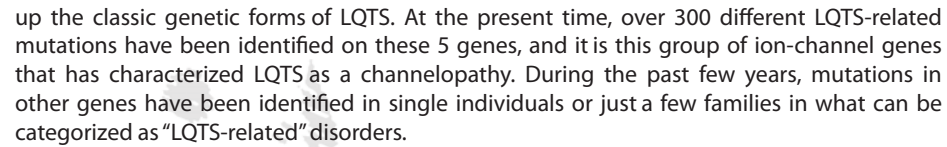
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This review focuses on the inherited form of the long QT syndrome (LQTS) and will not cover acquired causes of QT prolongation. Hereditary LQTS is a familial disorder in which most affected family members have delayed ventricular repolarization as manifest on the electrocardiogram (ECG) as QT prolongation. This genetic channelopathy has variable penetrance, with affected individuals having an increased propensity to syncope, polymorphous ventricular tachycardia (torsades de pointes), and sudden arrhythmic death. The estimated overt prevalence of this disorder is in the range of about 1:5,000 subjects. However, because the number of genotyped LQTS patients having 2 LQTS mutations is approximately 10%, the prevalence of LQTS patients with overt or subclinical disorders is likely to be considerably greater than the currently estimated prevalence.

The first family with LQTS, described by Jervell and Lange-Nielsen in 1957, consisted of 4 children with deafness, recurrent syncope, sudden cardiac death, and QT prolongation on the ECG. Subsequently, this disorder was found to be due to homozygous mutations of the KCNQ1 gene, with the deafness being a recessive manifestation of the reduced potassium current ( $I_{K_r}$ ). Romano et al. in 1963 and Ward in 1964 described families in which affected members had QT prolongation, recurrent syncope, and sudden death without deafness with an autosomal dominance pattern of inheritance.

Clinically, LQTS is identified by abnormal QT interval prolongation on the ECG. The QT prolongation may arise from either a decrease in repolarizing potassium currents or an inappropriate late entry of sodium into the myocyte. Most commonly, QT prolongation is produced by delayed repolarization due to mutations in the  $\alpha$ -subunit of ion channels involving either the slowly ( $I_{K_s}$ , KCNQ1, LQT1) or rapidly ( $I_{K_r}$ , KCNH2, LQT2) acting repolarizing cardiac potassium currents. Infrequent forms of LQTS may result from mutations involving the auxiliary  $\beta$ -subunits to KCNQ1 (minK, LQT5) and KCNH2 (MiRP1, LQT6), although there is not full agreement regarding the function of MiRP1. Mutations of the sodium-channel protein are associated with prolonged depolarization due to a small persistent inward "leak" in cardiac sodium ( $\text{Na}^+$ ) current  $I_{Na}$  (SCN5A, LQT3). The LQT1, LQT2, LQT3, LQT5, and LQT6 genes make





Typical clinical situation was observed by 11 years young boy with earlier treated epilepsy, no effect for medical treatment (carbamazepine), situation impaired in ages 9 – 11 years. By Holter Monitoring was identify markedly prolongation on QT interval in earlier morning and Torsades de Pointes ventricular tachycardia, spontaneous converted to sinus rhythm with syncopal episodes. Genetic tests were performed in collaboration with Aarhus University (Denmark). We founded mutations in gene HEGR P334L not only in 11 year young boy, but his father and brother, both family members are asymptomatic. ICD implantations was performed, medical treatment with beta blockers start immediately after ECG tests. Today patient is free of symptoms.

The recent commercial marketing of short-turnaround-time LQTS genetic diagnostic testing, and increasing availability of testing through university-affiliated laboratories, may establish genetic testing as a clinical tool. However, before widespread use, the clinical validity of LQTS genetic testing needs to be more widely established. Thus, the current genetic test can be expected to capture approximately three-fourths of phenotypically affected LQTS individuals, whereas a negative genetic test in a subject with clinical LQTS (i.e., genotype-negative/phenotype-positive LQTS) provides no basis for removing the diagnosis. Despite this, a positive genetic test may influence treatment decisions (see subsequent text) and may provide the means for precise "carrier" status classification of potentially at-risk relatives. Furthermore, genetic testing may be important in the identification of concealed LQTS, because a significant minority (25% to 50%) of individuals with genetically proven LQTS have a nondiagnostic QTC.





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