## Poster

**P 1**

**Chronic Rotational Ankle Instability- A case series study**

*Yousef Alrashidi[1], Christian Stelzenbach[2], Martin Wiewiorski[3], Mario Herrera-Perez[4], Victor Valderrabano[5]*
*[1] College of Medicine, Taibah University, Almadinah Almunawwrah, Saudi Arabia*
*[2] Department of Orthopaedics, University Hospital of Basel, Basel, Switzerland*
*[3] Kantonsspital Winterthur, Winterthur, Switzerland*
*[4] University Hospital of Canary Islands, Tenerife, Spain*
*[5]Chairman Orthopaedic Department, Schmerzklinik Basel,Genolier Swiss Medical Network(GSMN), Basel,Switzerland*

**Objective**: To assess the clinical outcome of anatomical ligamentous reconstruction of normally aligned ankles with chronic rotational instability, i.e. combined lateral and medial ankle instability.
**Methods**: Nineteen cases(11 female, 8 male) with clinical and radiological evidence of rotational ankle instability and no evidence of hindfoot mal-alignment, were treated by anatomical surgical reconstruction. Cases were followed a minimum of six months postoperatively.
**Results**: 18 out of 19 patients (94.7%) returned to sport and full-time work within three months postoperatively. One patient (5.3%) returned after six months and had pain-free range of motion and walking. One case (5.26%) had persistent lateral ankle instability.
**Conclusion**: Anatomical reconstruction of chronic, rotationally unstable, ankle with normal hindfoot alignment may yield a favorable short-term outcome. However, there is a need for a larger cohort to examine both short and long term clinical outcome in such cases.

**P 2**

**Sports Behavior in Individuals with Anomalous Coronary Arteries Originating from the Opposite Sinus of Valsalva**

*Christoph Gräni[1], Dominik C. Benz[1], Christian Schmied[2], Dominik Steffen[1], Jan Vontobel[1], Fran Mikulicic[1], Oliver Gaemperli[1], Ronny R. Buechel[1], Philipp A. Kaufmann[1]*
*1 Department of Nuclear Medicine, Cardiac Imaging, University Hospital Zurich, Zurich, Switzerland*
*2 Department of Cardiology, University Heart Center Zurich, Zurich, Switzerland*

**Background** Anomalous coronary arteries originating from the opposite Sinus of Valsalva (ACAOS) are associated with angina pectoris, syncope and sudden cardiac death; the latter especially in athletes with malignant variants. We assessed sports behavior, sports-related cardiac symptoms in individuals with incidental finding of ACAOS and possible concomitant coronary artery disease (CAD) detected by computed cardiac tomography angiography (CCTA).
**Methods** Individuals with ACAOS detected by CCTA at our institute between 12/2008 and 06/2015 were included. ACAOS with an interarterial course (between the aorta and pulmonic artery) were classified as malignant, whereas all other variants were considered benign. Obstructive CAD was defined as ≥50% vessel stenosis. Sports behavior, sports-related cardiac symptoms and follow-up were evaluated by telephone interview and review of the patient charts.
**Results** We identified 23 individuals (63±10 years, 70% male) with ACAOS detected by CCTA with 14 (61%) being malignant variants. Eleven patients (47.8%) showed concomitant CAD with no significant difference between malignant and benign variants. Six patients (26%) were not engaged in sports, whereas 8 (35%) were recreational athletes, 8 (35%) competitive athletes and one (4%) elite athlete. Most practiced sports were ball games (41%) and endurance sports (35%). Eight patients (47%) complained about sports-related cardiac symptoms such as typical angina (4), Dizziness (2), Dyspnea (1) and syncope (1). Patients with malignant variants did not significantly differ from patients with benign variants regarding cardiac symptoms ($p$=NS). During follow-up (mean 4.1±2.8 years), adverse cardiac events were rare, with one patient undergoing urgent revascularization of obstructive CAD in a non-anomalous vessel.
**Conclusion** Engagement in sports activities is frequent in this study of middle-aged individuals with ACAOS and high rate of concomitant CAD detected by CCTA. Sports-related cardiac symptoms were not uncommon; however, they did not differ between malignant and benign variants. Adverse cardiac events in middle term follow up in this cohort was very rare and due to CAD and not to the anomalous vessel itself.

**P 3**

**Sports-related sudden cardiac death in Switzerland classified by static and dynamic components of exercise**

*Christoph Gräni[1], Nina Chappex[2], Tony Fracasso[3], Cristina Vital[1], Christoph Kellerhals[1], Christian Schmied[4], Ardan M. Saguner[4], Lukas D. Trachsel1, Prisca Eser[1], Katarzyna Michaud[2], Matthias Wilhelm[1]*
*1 Department of Cardiology, Inselspital, University Hospital Bern, Bern, Switzerland*
*2 University Center of Legal Medicine, Lausanne and Geneva, University of Lausanne, Switzerland*
*3 University Center of Legal Medicine, Lausanne and Geneva, University of Geneva, Switzerland*
*4 Department of Cardiology, University Heart Center Zurich, Zurich, Switzerland*

**Background/Aim** There is an ongoing debate whether pre-participation screening (PPS) can prevent sudden cardiac death (SCD) in athletes. In Switzerland, PPS including an electrocardiogram is only mandatory for elite athletes. We assessed the incidence, distribution and underlying causes of SCDs according to static and dynamic components in athletes.
**Methods** Between 1999 and 2010 forensic reports of Switzerland for SCD in young individuals (10-39 years) were retrospectively reviewed. Data were collected in an anonymized fashion in the Swiss Registry of Athletic Related Death. SCDs were categorized based on peak static and dynamic sports components (I to III represents increasing static, A to C increasing dynamic components).
**Results** Sixty-nine SCDs were identified. 48 (69.6%) occurred during recreational (REC) and 21 (30.4%) in competitive (COMP) sports. Incidences for COMP and REC were 0.90/100'000 and 0.52/100'000, respectively (p=0.001). Most SCDs occurred in IC (23, 33.3%), followed by IIC (13, 18.9%), IIIA and IIIC (11 each, 15.9%), IIIB (6, 8.7%), IIA (4, 5.8%), and IB (1, 1.5%). No SCD was found in IA and IIB. Coronary artery disease (CAD) was the most common underlying pathology, and was present in 50% of the SCDs in IIC, 30% in IC, 27% in IIIA, 27% in IIIC and 23% in III.
**Conclusions** The more dynamic and/or static sports were, the greater was the number of SCD. CAD was the most common underlying cause for SCD, and was mostly represented in highest dynamic and/or static sports. Cardiovascular risk-factor screening might be included in the PPS in order to detect premature CAD in young athletes

**P 4**

**Effects of training load on heart rate variability during sleep in world class alpine skiers**

*Herzig D[1], Testorelli M[1], Schäfer D[1], Erlacher D[2], Achermann P[3], Eser P[1], Wilhelm M[1]*
*[1]Preventive Cardiology & Sports Medicine, Inselspital Bern*
*[2]Institute of Sport Science, University of Bern*
*[3]Insitute of Pharmacology and Toxicology, University of Zürich*

**Background/Aim:** Heart rate variability (HRV) is a marker for the cardiac autonomic nervous system and an objective measurement of recovery state. Sleep, in particular slow-wave sleep (SWS) plays a fundamental role in the recovery process and provides an emotion-free state. The aim of this study was to examine the effects of training load on HRV in SWS as well as in the morning after awakening.
**Methods:** Eleven world cup level alpine skiers (age 25.9 ± 2.7 y) were recruited. In each athlete, RR-intervals were monitored by ECG during ten nights' sleep and 1-channel EEG was recorded in a subsample of two to four nights. SWS was derived from the HRV signal and identified when the correlation coefficient of successive RR-intervals (rRR) was below an individually but systematically set threshold during at least 5 min, and verified with the EEG signal. Each night's second SWS segment was chosen for analysis. Mean RR interval and root mean squared differences of successive RR intervals (RMSSD, a marker for vagal tone) were calculated during a 5 min. segment. Further, HRV was recorded after awakening in supine position as well as after orthostatic challenge (OC). Training duration and training intensity, using Borg Scale, were recorded every day and used to calculate training load. Relationship between training load and HRV parameters were calculated using linear mixed models.
**Results:** A total of 68 nights of 9 athletes could be used for analysis. There was a significant effect of training load on RMSSD during SWS and standing after OC but not during supine position after awakening. An expected negative correlation was found between training load and RMSSD in standing position, but an unexpected positive relationship between training load and RMSSD during SWS.
**Conclusions:** Effects of training load are reflected in HRV parameters during SWS as well as after an orthostatic challenge in the morning. However the validity of a supine HRV measurement after awakening, as commonly used in research studies, may be queried. Finding a physiological explanation for higher marker of vagal tone in SWS will be the focus of future studies.

## Poster

**P 5**

**Vagal reactivation after exercise and cardiac autonomic nervous activity in Fontan patients**

*Vogt M[1], Herzig D[1], Stämpfli R[1], Trovato M[2], Schmid J-P[1], Schwerzmann M[2], Eser P[1], Wilhelm M[1]*
[1]*Preventive Cardiology & Sports Medicine, Inselspital Bern*
[2]*Center for Congenital Heart Disease, Inselspital Bern*

**Purpose:** Patients with complex congenital heart disease (CHD) and Fontan circulation have been characterized to have a reduced heart rate variability (HRV) measured in supine position compared with healthy subjects. However, cardiac autonomic nervous activity (CANA) in response to orthostatic challenge has not yet been documented in these patients. Heart rate recovery (HRR, marker for vagal reactivation) at cessation of exercise has previously been shown to be predictive of mortality in Fontan patients. The aim of this study was to compare HRV at rest in supine and standing position and HRR between Fontan patients and healthy controls.
**Methods:** Fontan patients without pacemakers, age, gender and body mass index (BMI) matched healthy volunteers with a minimum age of 18 years were recruited. Participants rested in supine position with a Holter-electrocardiogram (ECG) for 15 min whereof the last 4 min before standing up were used for HRV analyses. After standing up another 4 min window in the upright position was analysed. Breathing was controlled at a frequency of 0.25 Hz. The power of the following frequency bands were analysed by fast-Fourier transformation: High frequency (HF) power 0.15 Hz - 0.4 Hz, low frequency (LF) power 0.04 Hz - 0.15 Hz. For investigation of vagal reactivation after exercise, heart rate recovery (HRR) at 30 s and 60 s after exhaustion was determined.
**Results:** Seven Fontan patients (3 male/4 female) and 12 controls (5/7) were included in the study. In both supine and standing position, total power, HF and LF power were reduced in Fontan patients compared to controls (by approximately a factor of 10) while there were no differences in meanRR and LF/HF power ratio. Response to the orthostatic challenge was blunted in Fontan patients compared with controls. HRR was not different between groups.
**Conclusion:** This is the first study to show that Fontan patients, despite having a greatly reduced HRV not only at rest but also in response to an orthostatic challenge, had the same HRR, i.e. the same vagal reactivation after exercise as healthy volunteers. This indicates that they may not have a reduced activity of their vagal autonomic nervous system per se, but a lesser need for cardiovascular blood-pressure adjustment due to an increased venous capacitance, as suggested previously.

**P 6**

**Walking activity of the medical staff in the Clinique romande de réadaptation**

*Connaissa ML[3], Ducki J[3], Vuistiner P[2, 4], Luthi F[1, 2], Léger B[1,2], Terrier P[1,2]*
*1 Clinique romande de réadaptation SUVACare, Sion*
*2 Institut de recherche en réadaptation-réinsertion, Sion*
*3 Institut des Sciences du Sport, Université de Lausanne*
*4 Institut universitaire de médecine sociale et préventive, CHUV, Lausanne*

Medical staff is a major player to promote physical activity (PA) among patients. Their personal PA habits and practice can influence their PA advices. Since time at work represents a major portion of the day, we decided to observe job's effect on daily walking activity (WA) and how this activity is perceived.
Sixty-nine therapists from different care units of the Clinique romande de réadaptation (CRR) took part in the study, i.e., physiotherapists (N=23), nurses (N=26) and medical doctors (N=20). The number of steps per working day was assessed with a lightweight accelerometer over one week. Multiple linear regression was used to estimate the association between the number of steps and the job functions, adjusting for sex, age and BMI. The subjective perception of PA level was assessed by the Baecke questionnaire.
The adjusted model explained 29% of the variance in steps per day. No significant effect of sex, age and BMI was observed, whereas job function had a highly significant effect. Physiotherapists were the most active with a daily average of 14619 steps (95% Confidence Interval: 12865-16373), followed by nurses (12417, CI: 10541-14291) and medical doctors (9838, CI: 7677-11999). Therapists' self-perception of PA was significantly correlated with the objective measure (correlation between Baecke score and average steps per day: r = 0.35).
We showed that job function had a substantial influence on daily WA. However, this may be due to local organisation of the medical care, and the results are difficult to generalize to other care centers. Physiotherapists' WA exceeded by 50% the recommendation of 10'000 steps per day. By their proximity with patients, they can act as a leading example to promote PA. Further studies are needed to assess whether care in a rehabilitation clinic is effective to increase PA of inpatients during the stay and after the discharge. The long-term aim is to provide adapted and individualized PA counselling to efficiently promote active lifestyle.

**P 7**

**Body parameters and level of physical fitness of Swiss border guards**

*P.-E. Fournier, M. Duc, A. Crettenand, P. Terrier, B. Léger*
*Clinique romande de réhabilitation SuvaCare*

According to age, Swiss border guards have to pass physical tests every 2 years for the oldest and every 4 or 5 years for the youngest ones. The aim of this project was to describe physical and fitness parameters of this cohort and to enhance physical activity among them. 1752 guards, aged 25 to 62, were investigated. For 522 of them, fitness check was repeated several times. Only 115 females belong to the cohort, we do not present their results in this study. All assessments were held in 10 Swiss Olympic Medical Centers.
VO2 max was estimated during a bike or treadmill incremental test. Power was measured with an accelerometer (Moytest ®) during push-up for upper limb and squat jump for lower limb.

| Age | 20-30 | 30-40 | 40-50 | >50 |
|---|---|---|---|---|
| Weight kg | 79.12 ±10.34 | 84.32 ± 11.51 | 86.66 ±12.92 | 85.14 ±12.59 |
| Size cm | 178.44 ±5.99 | 178 ± 6.06 | 177 ±6.68 | 175 ± 5.58 |
| BMI | 24.75 ±10.34 | 26.43 ±3.21 | 27.29 ±3.60 | 27.50 ± 3.63 |
| % fat | 19.15 ±5.37 | 22.32 ±6.62 | 25.12 ±7.63 | 25.11 ±7.46 |
| VO2 max ml/min/kg | 45.27 ±10.40 | 40.88 ± 10.66 | 36.37 ±10.03 | 35.17 ±9.43 |
| Lower limb Power W/kg | 46.03 ±7.50 | 41.98 ± 6.66 | 39.03 ± 6.44 | 35.44 ±5.71 |
| Upper limb Power W/kg | 17.06 ±7.49 | 14.92 ±7.31 | 12.18 ±4.97 | 11.62 ± 8.07 |

After the age of 35, BMI from border guards is higher than the one of the Swiss population; 50 % of the cohort shows a BMI between 25 and 30 and 18 % over 30. Power declines with age, possibly more in upper limb. VO2 max is comparable of the Swiss population by young people but then lowers from the age of 35.
Repeated measures were done for 522 subjects. Mean age was 45.5 years at T1, 48.43 years at T2. According to the measure and its variability, VO2 max doesn't change significantly between T1 and T2. Strength, speed and power show a tendency to a decrease. All these data from this unique big cohort has to be further analyzed and correlations between level of activity, health self-estimation and measured parameters have to be made.

**P 8**

**Health status, sport practice of Swiss border guards**

*P.-E. Fournier, M. Duc, A. Crettenand, P. Terrier, B. Léger*
*Clinique romande de réhabilitation SuvaCare*

Between 2010 and 2014, 1752 Swiss border guards, aged from 25 to 62, passed 2618 medical checks. 10 Swiss Olympic Medical Centers contributed to the assessment. Guards had to fill out questionnaires about their health, physical activity and hardness of work. The aim of the study was to describe this cohort and to enhance physical activity.
20 % of the cohort is following medical treatment, 18 % suffer from rheumatism, 15 % from cardiovascular diseases, 9 % from other chronic diseases.
26 % are limited in their physical capacities by a health problem, 6 % declare to be unfit to any sports activity. Only 46 % practice regularly a sport which is less than the general Swiss population participation to sports. The great majority is conscious of this gap, only 9 % think they do enough activities for their health. 82 % of the cohort considers that physical activity is an important element for health. 2 % evaluate their general health as bad or very bad, 20 % as poor.
6 % mention their profession as hard, involving intense periods of work for 35 % of the guards. Their job needs an intense concentration for 78 % of them. 60 % admit a stressful job.
Only 15 % announced balanced diet, 54 % think their diet is not balanced at all. 86 % of the subjects explain poor sport and food habits by irregular timetable and night duty. The oldest part of the cohort was evaluated more than once. 522 guards were questioned twice, three years apart. Their mean age was 45 at T1, comparisons has to be made to find if the first assessment, the individualized advices given at the first fitness check has any impact on self-sports participation and others health parameters.