medication and physical therapy. They had evidence of impaired multifidus motor control (positive prone instability test) and no indication for spine surgery. Participants delivered stimulation for up to 30 minutes twice daily causing repetitive tonic multifidus contractions and remain in long-term follow-up.

Results: At baseline (N=204), participants were 47±9 years of age, had a history of 14±11 years of backpain, average LBP-VAS of 7.3±0.7 cm, ODI of 39±10, EQ-5D of 0.585±0.174 points and had pain on 97±8% of days in the prior year prior. Despite limited effectiveness, 37% of participants were using opioids at baseline.

At 3 years (N=129), average LBP-VAS had improved by 4.9±2.4 cm (68.1%), ODI by 22.9±15.2 points (58.9%) and EQ-5D by 0.220 ±0.196 (All p<0.0001); 77% of participants had a ≥50% LBP-VAS improvement; 68% reported LBP-Resolution (LBP-VAS≤2.5 cm); 64% had a ≥20-point ODI improvement and 86% of participants were "definitely satisfied" with the treatment. As pain and disability are interdependent symptoms, treatment success is determined by both: 83% had an improvement of ≥50% in LBP-VAS and/or ≥20points in ODI, and 57% had these improvements in both. Of participants using opioids at baseline, 72% had voluntarily discontinued (51%) or decreased (21%) consumption. The overall safety profile is favorable compared to other neurostimulation systems and no lead migrations were observed. During the third follow-up year, 6 participants requested device removal citing resolution of pain.

Discussion: Overall trial results demonstrate effectiveness, durability, and safety. Progressive long-term improvements are consistent with the restorative mechanism of action.

Impact and application to the field: Restorative neurostimulation should be considered in patients with intractable mechanical CLBP associated with multifidus control impairment refractory to specialist physical therapy.

The Author declares no conflict of interest

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(P100019)

Relationship between ventilatory efficiency and salivary mitochondrial DNA copy number in aerobically trained adolescent athletes

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Introduction: It has been reported that endurance exercise training improves cardiorespiratory fitness levels (e.g., peak oxygen uptake: VO_2peak) and mitochondrial function. On this matter, one study has shown that ventilation efficiency may be directly related to salivary mitochondrial DNA copy number (as an index of mitochondrial content) in healthy subjects with relatively low aerobic capacity (33 ml/kg/min VO_2peak). However, the causal relationship for these indices in adolescent athletes is not yet clear. The purpose of this study was to clarify the relationship between ventilatory efficiency and salivary mitochondrial DNA copy number in aerobically active adolescent athletes.

Methods: Adolescent male and female athletes with similar fitness levels (Males; n=12, age: 15.2±1.6 years, VO_2peak [peak oxygen uptake relative to fat free mass]: 77.2±9.8 ml/kg FFM/min; Females; n=11, age: 15.1±0.8 years, VO_2peak: 72.3±5.7 ml/kg FFM/min [mean±SD]) were recruited as the participants. All participants executed an incremental cycling exercise until volitional exhaustion to measure ventilatory efficiency, including ventilatory threshold and peak oxygen uptake on an electromagnetically braked cycle ergometer. Each participant conducted a cycling exercise at an initial power output of 0 W for three minutes, which was increased by 25 W every 1 min until exhaustion. Pedaling frequency was 60 rpm. Expired gases and heart rate were continuously analyzed with using a respiratory monitor system and electrocardiograph. Ventilatory efficiency was assessed with the lowest minute ventilation per unit carbon dioxide production (VE/VCO_2). Prior to maximal cycling exercise, salivary samples were collected for the later analysis of salivary mitochondrial DNA copy number quantified with real-time polymerase reaction. Correlation analyses were consequently performed to clarify the relationship between ventilatory efficiency and salivary mitochondrial copy number.

Results: No significant correlation was observed between ventilation equivalent and salivary mitochondrial DNA copy number in adolescent male (p=0.379) and female athletes (p=0.672).

Discussion: Previous investigation has shown that ventilatory efficiency may correlate with salivary mitochondrial DNA copy number in healthy people with relatively low aerobic fitness. On the other hand, the results of our study showed no significant differences between these indicators. This disparity may partially be due to the relatively higher aerobic fitness of the participants (VO_2peak values: 55 ml/kg/min and 72 ml/kg FFM/min) in this study than in the previous study. In conclusion, the findings of this study suggest that there may be no direct link between ventilation efficiency and salivary mitochondrial DNA copy number in aerobically fit adolescent males and females.

Impact and application to the field: If a method of assessing fitness levels could be established using saliva, based on biomarkers of the mitochondrial function system, it could be a useful indicator for checking the physical condition of adolescent athletes.

We have no conflict of interest of relevance to the submission of this abstract.

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(P100020)

Effects of long-term training on whole body DNA oxidation in adolescent female volleyball athletes

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Introduction: Setting optimal training volume is important to prevent injuries and disorders induced by overtraining when adolescent athletes engage in sport-club activities. On this point, if non-invasive biomarkers related to oxidative stress could be used to monitor the physical condition of athletes, it is expected to provide athletes with some feedback to maintain and improve performance levels for the athletes. The aim of this study was to examine the cumulative effects of 12 months of volleyball training on whole body DNA oxidation (accounted for by urinary 8-hydroxy-2'-deoxyguanosine) in adolescent female athletes.

Methods: Nine eumenorrhoeic female volleyball players (as baseline values; age: 15.2±0.4 year, height: 159.9±5.9 cm, body weight: 54.9 ±6.4 kg, BMI: 21.4±1.6 kg/m^2, body fat: 22.1±4.7 % [mean±SD]) served as the participants. Each athlete performed volleyball training in the school gym, which consisted of ball handling, specialized drills, and practical game-style exercises, including physical training. The training cycle consisted of six days per week, with a total of approximately 2 to 2.5 of volleyball training per day. In order to examine the cumulative effects of whole body DNA oxidation, urine samples were collected before and after volleyball club activities on three successive days (Days 1, 3, and 5) at 0 (baseline) and 12 months (two consecutive summer seasons), respectively, for the later analysis of 8-hydroxy-2'- deoxyguanosine (8-

OHdG) determined with high performance liquid chromatography.

Results: A two-way analysis of variances represented main effects for session ($p<0.05$, 0 and 12 months), but not for day (Days 1, 3 and 5) or interaction regarding the levels of urinary 8-OHdG (ng/ml creatinine, values computed as the average of three successive days, Day 1: 2.1±0.8, day 3: 2.8±0.9, Day 5: 3.1±1.1 for 0 month, Day 1: 4.1±1.4, day 3: 3.8±1.7, Day 5: 3.6±1.3 for 12 months, respectively).

Discussion: Previous studies have found that high-intensity exercise training increases oxidative stress. On the other hand, moderate-intensity exercise training has been reported to increase antioxidant capacity as a result of training adaptation. In this study, increased whole-body DNA oxidation was observed, but it remains to be elucidated whether it is derived from the amount of training (dependent on intensity and duration), induced from hydration status in a warm-humid environment, or derived from hormonal fluctuation (e.g., estrogen). In conclusion, the results of this study suggest the possibility of increased responses in whole-body DNA oxidation to the long-term volleyball training in adolescent female athletes, which appears to be a transient increase.

Impact and application to the field: When adolescent athletes train for extended periods of time in a warm-humid indoor environment such as a gymnasium without air conditioning, measuring biomarkers of oxidative stress can provide useful information for athletes to manage their physical condition.

We have no conflict of interest of relevance to the submission of this abstract.

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(P100021)

Effectiveness of hydration education to improve hydration status during summer seasons in adolescent female indoor-sport athletes

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Introduction: When athletes conduct sport practices and competitions for long periods of time in a warm-humid indoor environment without air conditioning or other climate control equipment, care must be taken to prevent heat stroke. In this regard, it is necessary for coaches and other instructors to provide athletes with hydration education (optimal hydration strategy) so that each athlete understands and puts it into practice However, it is still unclear how much hydration education for adolescent athletes is effective in maintaining and improving their performance levels. The objective of this study was to assess the effects of an educational intervention on hydration status during summer seasons in adolescent female indoor-sport athletes.

Methods: Ten eumenorrhoeic female volleyball athletes (as baseline values; age: 15.2±0.4 years, height: 159.9±5.5 cm, body weight: 55.2±6.1 kg, BMI: 21.5±1.6 kg/m^2, body fat: 22.4±4.5 % [mean±SD]) participated in this study. In addition to physical training, volleyball training, including ball handling, specialized drills, and game-style practical skills, was conducted in the school gym for approximately 2 to 2.5 hours per day, six days a week. All participants were educated about hydration strategies for approximately 1 hour at 0 (baseline), 10, and 22 months, respectively. Each individual consumed ad libitum commercially available carbohydrate-electrolyte solution (Pocari Sweat®, Otsuka Pharmaceutical Co., Ltd.; energy:104.6 kJ/100 mL, carbohydrate: 6.2%, Na^+:21 mEq/L, K^+:5 mEq/L, Cl^-:17 mEq/L) over the daily practice. After heat acclimatization has naturally occurred in all participants, urine samples were collected before and after volleyball club activities on three successive days (Days 1, 3, and 5) at 0, 10, and 22 months (three consecutive summer seasons), respectively, for the later analysis of the urine specific gravity in order to determine hydration status determined by a refractometer. Changes in body mass and fluid intake were also recorded.

Results: A two-way analysis of variances showed main effects for time ($p<0.05$, before and after), but not for session (0, 10 and 22 months) or interaction concerning the levels of urine specific gravity (values calculated as the average of three successive days, before: 1.027±0.004; after: 1.030±0.003 for 0 month, before: 1.028±0.004, after: 1.030±0.004 for 10 months, before: 1.025±0.006, after: 1.029 ±0.004 g/mL for 22 months) following each hydration educational session. **Discussion:** Prior research has argued whether education about hydration strategy during practice and games improves hydration status, but in practice, some cases have been improved by such education and others have not. Possible reasons for those differences include the divergences in hydration methods using cups or plastic bottles and in indoor environments not equipped with air conditioning. In conclusion, the results of our study imply that several sessions of hydration education may not be sufficient to lead to the dramatic improvement of hydration status.

Impact and application to the field: Hydration education needs to be continued until each athlete understands and is able to put into practice what they have learned.

We have no conflict of interest of relevance to the submission of this abstract.

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Community participation in the design and development of a physical activity and psychosocial program for Indigenous girls: Processes, experiences and lessons learnt

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Introduction: Recent social changes in political and academic thinking have improved the way Indigenous health research is conducted. A wealth of resources containing theoretical and practical guidance are now available to support academics and health practitioners when engaging Indigenous peoples in research. Despite this evolution of practice, Indigenous health disparities still pervade, indicating something is missing in the Indigenous health research toolbox. One identified gap is a lack of documented experiences detailing how broad ethical guidelines and principles may be practically applied. This presentation will 1) describe the research processes involved in co-designing a physical activity and psychosocial health program for young Indigenous girls and 2) highlight key learnings of the collaborative research journey from an intercultural lens.

Methods: Information and guidance regarding appropriate research engagement with Indigenous peoples were gathered over the project's first year. Data gathering activities included: a review of relevant literature, discussions at team meetings, a consultative workshop with Indigenous community members, and briefings from an Aboriginal Reference Committee. This information was then aligned with the Criteria for Strengthening Reporting of Health Research involving Indigenous Peoples (CONSIDER) statement and used to document participatory research activities undertaken with