Background
Sport can represent an important aspect of people’s lives, for professional and recreational athletes. Some sports involve a high risk of orofacial trauma, particularly contact sports. Undoubtedly, mouthguards are considered by many as an effective solution in preventing injury.

Objective
This systematic review aimed to measure the effectiveness of mouthguards in preventing oral-facial injuries.

Design
Preferred Reporting Items for Systematic Reviews (PRISMA)

Setting
Available electronic databases

Patients (or Participants)
Contact sport athletes

Interventions (or Assessment of Risk Factors)
MEDLINE and EMBASE electronic databases searches were supplemented by manual searching, of in-vivo studies examining prevention of orofacial injuries by protective devices that cover the teeth and surrounding soft tissues (mouthguards).

Main Outcome Measurements
Included studies were assessed for methodological quality and bias. A meta-analysis was performed on data from selected studies, comparing the number of injuries for mouthguard users and non-users. Results are presented as forest plots and relative risks between different studies compared.

Results
1745 records were identified. Fifteen studies were eligible for inclusion in the qualitative synthesis, seven were included in the meta-analysis. The overall quality of studies was low, primarily due to a high degree of bias. The degree of heterogeneity was high throughout the studies affecting most of the variables such as sport, athletes’ age, the definition of injury used and type of mouthguard. The meta-analysis showed that wearing a mouthguard was associated with a greater risk of orofacial injury when compared to non-users (overall RR 0.85%, 95% CI 0.78–0.93). However, the high degree of heterogeneity questions the validity of the summary estimate. (I-squared= 91.2%).

Conclusions
There is insufficient evidence to support or refute the use of mouthguards to prevent orofacial injuries. Further research from high quality prospective cohort studies are needed to investigate the protective nature of mouthguards from orofacial injuries, when used in sports. The meta-analysis findings could be explained by athletes being more physical in the knowledge that they are protected.
ophthalmological point of view (already for a long time). For one-eyed athletes or sports persons with monocular defective vision protective sports goggles should be obligatory in order to protect the remaining healthy eye.

### 347HOW CAN WE PROTECT ATHLETES FROM DENTAL EROSION?

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Background Our data on more than 800 participants shows that dental erosion (DE) affects up to 45% of elite athletes and may have physical and psychosocial impacts. The condition is associated with consumption of sports drinks and is exacerbated by reduced salivary flow. The protein rich layer called dental pellicle (DP) may have a protective function for DE and this might prove to be a useful therapeutic target in elite sport.

Objectives To assess the protective function of DP against DE.

Design In vitro study.

Setting Laboratory.

Participants 40 bovine incisors

Interventions Two levels. 1: We exposed twenty bovine incisors to an energy drink (pH 3.1) at 24, 48 and 72 hours to create an in-vitro pellicle model. Erosive lesions were investigated both in the presence and absence of a layer of dental pellicle. Main outcome measurement Mean depth of erosive lesions by optical coherence tomography (OCT) and X-ray Microtomography (XMT).

Results OCT showed the mean thickness of amorphous enamel before immersion in the erosive medium was 64 μm (SD 2.3, IQR 54.7 – 63.2). The mean depth of the erosive lesion after immersion was 240.8 μm (SD 32.7, IQR 263.8 – 263.8) (p<0.001) at 72 hours. In contrast, mean depth of lesion in the presence of the dental pellicle was 84.3 (SD 18.9, IQR 75.3 – 93.2) (p<0.001). XMT showed the mean depth of erosive lesions was 130 μm (SD 2.3, IQR 244.6 – 263.8) (p<0.03). XMT showed the mean depth of erosive lesions was 130 μm (SD 28.2, IQR 10.1136/bjsports-2021-IOC.315

Conclusions Erosion was reduced but not prevented by presence of dental pellicle. This model shows promise as a method to investigate novel interventions to prevent DE in elite athletes.

### 348MICROBIOME ANALYSIS IN ELITE SPORT

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Background There is increasing interest in the microbiome in performance and prevention of illness.

Objective To investigate characteristics of oral and gut microbiomes in elite sport.

Design Metagenomic sequencing performed on stool and saliva samples at baseline and three months. Taxonomic identification of the DNA sequence data generated on the Illumina sequencing platform, followed by unsupervised Principle Component Analysis (PCA). UCL Research Ethics Committee ID Number: 6388/002.

Setting 1: A GB Olympic team, n=18; 2: English premiership rugby team, n=18; 3: Healthy volunteers (non-athletes) n=28.

Participants Aged ≥18 years, able to understand consent process, for health controls body mass index18 to 30 kg/m2.

Assessment Of Risk Factors Oral health, BMI, use of antibiotics.

Outcome Measurements Unsupervised PCA.

Results Two distinct clusters emerged, one of athletes and one of non-athletes. Specific species-level signatures distinguishing the two clusters as well as each cohort were identified, including *Fusobacterium nucleatum* enriched in athlete samples relative to non-athlete controls, *Streptococcus mitis* enriched in rugby relative to both Olympic athletes and non-athletes, and *Neisseria meningitidis* enriched in Olympic cohort relative to both rugby and non-athletes (all P<0.005). For saliva PCA analyses, no distinct clusters emerged between the two athlete cohorts or timepoints. However, specific species-level signatures distinguishing the groups were identified, including multiple *Neisseria spp*., being elevated in rugby relative to Olympic athletes at both timepoints, *Prevotella bivia* being elevated in Olympic athletes relative to rugby at both timepoints, and *Bifidobacterium longum* being almost exclusively detected in the Olympic cohort but not rugby.

Conclusions Marked differences in microbiome signatures were found between both elite athletes and non-athletes and between team and individual sport cohorts. Further studies may help identify microbial factors related to optimal food conversion, performance or recovery, and prediction of illness risk.

### 349EQUIPMENT-RELATED RISK FACTORS FOR ACL INJURY AMONG RECREATIONAL SKIERS – A CASE CONTROL STUDY

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Background In recreational skiing, an ACL injury is one of the most common diagnosis.

Objective To compare equipment-related risk factors between ACL injured and uninjured skiers.

Design Case-Control study over the 3 winter seasons 2016/17–2018/19 in one major Austrian ski resort.

Participants 248 ACL injured (52% females) and 1054 uninjured skiers (48% females).

Assessment of Risk Factors ACL injury was diagnosed by MRI in a sports clinic located in the ski area. Ski length [m] and side cut radius [m] were taken from the information given on the ski and ski length was relativized to body height [%]. Combined height of ski and binding plate [mm] at the front (HF) and back part (HB) of the ski binding, and height at the toe (HT) and heel piece (HH) of the ski boot [mm] were measured with a digital sliding caliper. Quotients between HF and HB as well as between HT and HH were calculated.