28th ECSS Anniversary Congress, Paris/France, 4-7 July 2023

ACUTE EFFECTS OF JAW CLENCHING WHILE WEARING A CUSTOMIZED BITE-ALIGNING MOUTHGUARD ON MUSCLE ACTIVITY AND FORCE PRODUCTION DURING MAXIMAL UPPER BODY ISOMETRIC STRENGTH MIRÓ, A.

UNIVERSITAT RAMON LLULL

INTRODUCTION:

Beyond the preventive role of wearing bite-aligning mouthguards (MG), recent research has investigated its neuromuscular effects and the possible benefits in different parameters such as muscular strength, power or muscle activation (Allen et al., 2018; Ebben et al., 2008; Schulze & Busse, 2019). The reason for these positive effects may be associated to the phenomenon called concurrent activation potentiation (CAP). This raising mechanism may be promoted by a remote voluntary contraction (RVC) of the mandible muscles (Ebben et al., 2008). It has been reported that the use of these devices promote a better temporomandibular repositioning and a more powerful occlusion, which may magnify the effects of the RVC (Maurer et al., 2018). Thus the aim of the present study is to investigate the effects of jaw clenching while wearing a customized MG on masticatory and prime movers muscle activation as well as on force production during maximal upper body isometric tests. **METHODS:**

Twelve highly trained rink-hockey athletes participated in the study. A randomized, repeated measures within study design was carried out to compare the acute effects of three experimental conditions; jaw clenching while wearing MG (MG), jaw clenching without MG (JAW) and non-jaw clenching (NON-JAW). Conditions were randomly distributed to avoid the influence of fatique and the test learning effects. Participants performed three different isometric force tests following the next order: handgrip test (HG), bench press (BP) test and biceps curl (BC).

RESULTS:

Statistical analyses revealed a significant higher force production (p < 0.05) in all tests for MG conditions with respect to NON-JAW. When comparing JAW and NON-JAW conditions an increased peak force was found in handgrip (p = 0.045) and bench press (p = 0.018) but not in biceps curl (p = 0.562). When comparing MG and JAW conditions, no differences were observed in any force output. In terms of muscle activity, significant differences were found in the agonist muscles of the handgrip test for MG with respect to NON-JAW (p = 0.031 - 0.046), whereas no differences were observed when comparing MG and JAW conditions. CONCLUSION:

The present study demonstrated that jaw clenching, with and without MG, is a good strategy to increase the upper body isometric strength compared to NON-JAW condition. A higher isometric force production was observed in all tests for MG with respect to NON-JAW conditions. When comparing JAW and NON-JAW conditions, this improvement was only observed in two of the three tests. The non-significant differences found in force production neither in muscle activity between JAW and MG conditions, speculated that these ergogenic effects might be attributed to the jaw clenching, even though the use or non-use of MG.

Allen et al. (2018). J Strength Cond Res. 32(1), 237-243 Ebben et al. (2008). J Strength Cond Res. 22(6), 1850-1854 Maurer et al. (2018). PLoS ONE. 13(2), 1-17 Schulze & Busse (2019). Sports Med. Int. Open. 3), 96-101

Topic: **Training and Testing**

Presentation

E-poster

European Database of Sport Science (EDSS)

Supported by SporTools GmbH

