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RESEARCH ON INJURY SUSCEPTIBILITY

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Location

Unless other (individual) club arrangements, this research project is conducted at the '*Thim International Academy of Physiotherapy*', Nieuwegein (The Netherlands)

Authors Manuscript

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Title of the study (provisional)

Associations between the stomatognathic adaptive motor system (SMAS) and sports (re)injuries in elite athletes

Brief title of the study

SMAS and Sports (re)injuries

Background

It is well known that dental occlusion does have a postural influence and plays a big part in the neurological balance of muscular and postural systems. There appears to exist a relationship within the body between the dental occlusion and injury or re-injury symptoms when a dysfunctional occlusion (malocclusion) creates effects throughout the body (Fonder)[1]. This pilot study examines the correlation between occlusal function and the tendency to an increase in sports injury and re-injury susceptibility. The researchers would expect the tendency for sports re-injuries and increased sports injury susceptibility to be closely related to the dental occlusion and spatial awareness of the entire body. In this study functional information is collected and measured on the neuromuscular alterations induced by occlusal contact.

The starting point in this study is the stomatognathic motor adaptive syndrome (SMAS) according to Douglas, C.R, et. al,[2] which describes the motor response and the adaptive processes it induces. Malocclusion causes the mandible to move laterally, or more commonly distally, in order to reach an intercuspal position. Condylar displacements are a result of these movements. Temporomandibular joint (TMJ) receptors respond to the capsular mechanical stress and the information reaches the trigeminal sensory nuclei. The modified mandibular position seems to be important and may interfere with catecholaminergic neurotransmission in the basal ganglia. The main motor responses are increased jaw muscle tone, decreased velocity of movements and reduced coordination.

Research question

Might dental malocclusions be interpreted as a risk factor for the entire musculoskeletal, postural and movement system of the body? Might this be particularly important in the (developing) performance, sports injury susceptibility and reinjuries of football players and other athletes? Another goal of the study is to examine the interplay of these parameters to provide scientific information for a comprehensive diagnosis that can lead to appropriate therapy.

To be examined

1. The Impact of occlusion on the musculoskeletal and postural system
2. The interrelationship between malocclusions and sports (re)injuries (injury history)
3. The relationship between malocclusion and injury susceptibility
3. The benefits of using Mouth Gard bite in dental occlusal imbalance

Population

120 subjects in the test group will be selected from football players and other top athletes (M/F).

Inclusion criteria

- M/F
- Age between 17 and 27
- In good general and dental health
- A full permanent dentition in the maxillary and mandibular arch
- No history of surgery to the nasal, paranasal or oral cavities
- No allergies, nasal decongestant medication, or history of nasal obstruction

Objectivity

Examination will measure the plantar activity (COF or Centre of Force) by using the RS-scan Footplate (the RS-method has been described in the literature and as such validated and widely accepted) as well as the dental malocclusion by recording EMG activity of the m. masseters and mm. temporalis (left and right) via the MC wireless measure system of BTS – TMJOINT. This technology involves surface electromyographic analysis to measure the differential influence of the occlusal function using indices validated and published in scientific literature. A special feature of this system is the standardization of the electromyographic signal that is provided by the comparison between two clenching tests. The first test with cotton wool rolls between the upper and lower back teeth the second test without. This method allows the elimination of problems associated with the wrong positioning of the electrodes, of the different impedance of the patient's skin and the differences of muscular tropism making it accurate and repeatable. The results are shown via a special graphic interface that is easy to understand. The specialized software BTS Dental Contact Analyzer analyses the results and produces reports as a table, with pie charts or histograms.

Procedure

Measures

1. Filling in the Sports Injury Risk indicator (SIRI) questionnaire (self-rating)
2. BTS TMJ - COT4 with cotton rolls > recording in sit
3. COF (plantar activity) by RS scan with cotton rolls (eyes closed) > left foot
4. COF (plantar activity) by RS scan with cotton rolls (eyes closed) > right foot
5. BTS – Clench without cotton rolls > recording in sit
6. COF (plantar activity) by RS scan without cotton rolls (eyes closed) during clenching > left foot
7. COF (plantar activity) by RS scan without cotton rolls (eyes closed) during clenching > right foot
8. Use the TMJ tester into the mouth. Position the upper and lower front teeth in the cut-out section with the centerline of the teeth aligned with the centerline mark on the TMJ tester
9. BTS TMJ – with TMJ tester in mouth >recording in sit
10. COF (plantar activity) by RS scan with TMJ tester in mouth (eyes closed) > left foot
11. COF (plantar activity) by RS scan with TMJ tester in mouth (eyes closed) > right foot

Period study

Start April 2015 - End May 2017

[1] Fonder, A.C: The dental distress syndrome quantified, 1973

[2] Douglas, C.R, et. al: Stomatognathic adaptive motor syndrome is the correct diagnosis for temporomandibular disorders. 2010, Medical Hypotheses; 74(4):710-8.



