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FINITE ELEMENT ANALYSIS OF TEMPOROMANDIBULAR JOINT: DETACHMENT OF THE LATERAL PTERYGOID MUSCLE

Mazzocco, A.G.(1); Jardini, A.L.(1); Maciel Filho, R.(1); Nunes, E.L.(2);
(1) UNICAMP; (2) UNESP;

Temporomandibular joint (TMJ) is composed by fossa, located in temporal bone, and condyle, at mandible extremities. The function of this joint is to perform daily human activities such as speaking and chewing and for this reason is considered the most active human joint. Due to cyclic loading, TMJ disorders are mostly degenerative diseases and they impair TMJ function until it is necessary to replace the natural joint with an alloplastic replacement device. Nowadays TMJ alloplastic replacement devices are orthopedic prosthesis made of metal alloys and ultra high molecular weight polymers. According to the literature, TMJ replacement surgery is commonly performed worldwide achieving good outcomes. However clinical studies report that TMJ prosthesis present reduced joint kinematics with a limited translational mobility compared to natural joint. In case of unilateral TMJ replacement, this result generates a unilateral hipomobility and a contralateral overload. Several studies states that this is caused by lateral pterygoid muscle detachment during replacement surgery. This study performs a finite element analysis with Ansys software with the aim of evaluating effect of unilateral and bilateral pterygoid muscle detachment on mechanical behaviour of a natural human mandible.