Evaluation of MIR-OVD patients before and after anchorage through the silent period.

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The silent period is the phenomenon by which a given stimulus causes either electromyographic silence (a pause of activity) or inhibition in masticatory muscles. It is not possible to evoke the silent period in completely edentulous patients. The silent period partially reappears in edentulous patients who have been rehabilitated with complete dentures.

The aim of this study was to assess whether implant anchorage in completely edentulous subjects induces modifications of the silent period that could be ascribed to changes in the mandibular function.

Materials and Methods

The present study involved 10 completely edentulous patients who had been rehabilitated with full dentures anchored to 2 implants placed in the interforamina area by ball attachments (Fig 1).

The EMG activity from masseteric muscles and Kinesiografy (Computerized Mandibular Scanner) was recorded using a medical system (Fig. 2), through surface electrodes (Fig. 3). The sample frequency was switched from 470 Hz to 1390 Hz. The stimulus type used to investigate the SP consisted of 4 rapid mouth openings and closings with intercuspal clenching (Fig. 4). Each patient repeated the process 3 times in order to obtain the average characteristics of the SP. The procedure was repeated again 1 day, 1 week, 1 month and 3 months after anchorage.

SP samples were selected into the interval exhibiting low electrical activity comparable in amplitude to the baseline muscle discharge (Fig. 4). EMG, verticality and velocity signals were visualized at the same time (Fig 5): the SP was considered to begin where velocity and verticality are proximal to zero and to end when muscular activity starts again (Fig. 6). The SP length was calculated as ratio between number of samples and sample frequency (#/s). The signals were visualized by Matlab® and the statistical analysis was performed by Excel® support.

Results: SP is variable before the anchorage with a high Standard Deviation (10.6) (Fig. 7, column 1).

After the implant anchorage, SP decreases (p<0.05%) in both side (Fig.7): 20.3% at the anchorage, 25.1% after one week, 19.2% after one month and 20.7% after three months (Fig. 8). The SP measurements are more stable after anchorage (50% decrease of SD). After the anchorage the standard error is <2% (the chosen subjects represent the population).

Discussion & Conclusion: After implant anchorage SP seems to show an appreciable reduction.

Although the underlying mechanisms remain to be elucidated, the observed reduction in baseline amplitude of EMG activity and the recorded SP decrease suggest an improved mandibular function. The SP Standard Deviation reduction in measurements and the SP reduction after the anchorage could be due to:

• Free nerve endings around implants;
• Mechanoreceptors of the perimplant bone;
• Increased denture stability and retention immediately after anchorage;
• Muscosa trophism improvement.

After 1 and 3 months from anchorage the SP slightly increased tending to stableness.

SP can be considered one more feature to study the neuromuscular functionality of MIR-OVD patient.

References:

Jacobs B, Van Steenberghe D. Qualitative evaluation of masseteric post-stimulus EMG complex following mechanical or acoustic stimulation of osseointegrated oral implants. JOM '95; 10: 175-182.