Prospective Randomized Study on the Immediate Loading of Mandibular Overdentures Supported by One or Two Implants: A 3-Year Follow-up Report

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Purpose: A successful option for treatment of the edentulous mandible has been an overdenture supported by two dental implants using the traditional delayed healing protocol. However, it is not known whether a single implant can be similarly successful and if an immediate loading protocol can be used. ***Methods:*** A total of 36 subjects (16 men and 20 women) were included in the study. Subjects were randomly assigned to have either one (group 1) or two (group 2) Brånemark System TiUnite Groovy dental implants with a diameter of 3.75 mm and a minimum length of 10 mm placed in the interforamina area. The Brånemark System 2.25-mm ball attachment in combination with the ORS O-Ring System was used for denture retention. The retentive components were incorporated, and the denture was delivered to the patient the day of surgery. ***Results:*** Nineteen subjects (10 women and 9 men) were available for the 3-year follow-up. Group 2 included 8 subjects (5 women and 3 men), while the remaining 11 (5 women and 6 men) belonged to group 1. Nine subjects had been excluded during the first year due to failing implants, 1 subject had died, 1 reported severe illness, and 6 could not be reached. No implant failures were observed between the 12-month and 3-year follow-ups, and no technical complications had occurred. Patient satisfaction measured by the OHIP-19 questionnaire continued to be high in both groups when compared with the values before implant treatment. No significant differences were observed between groups. The most common need for maintenance was replacement of the retentive O-ring. ***Conclusion:*** Patient satisfaction remained high and need for prosthodontic maintenance was low after treatment with immediately loaded mandibular overdentures supported by one or two implants.

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Influence of Functional Improvement of Complete Dentures on Neuronal Activities

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Purpose: The increasing number of patients with dementia is becoming a social problem. Because tooth loss is a risk factor for dementia associated with Alzheimer syndrome, denture wearers are at risk for brain deterioration. Although denture adjustments can improve brain function, it is not yet clear which part of the brain is affected. This study investigated the influence of the removal of pain by denture adjustment on brain function. ***Methods and Materials:*** The subjects for this study consisted of 21 complete denture wearers (mean age: 75.6 years; 7 men, 14 women). To evaluate brain function, an electroencephalogram (EEG) was taken for 3 minutes both before and after denture adjustment. The Z score values were analyzed using neuronal activity topography. The brain potential was also evaluated as to the part of the brain affected by neuronal activities. The subjects were seated in a resting position with their eyes closed in a semi-anechoic (echoless) examination room at Tsurumi University Dental Hospital. After confirming that FFG was detected for 3 seconds, the EEG was recorded for 3 minutes using ESA-pro (Brain Function Laboratory) and 21 pasteless electrodes in a helmet. The data were analyzed statistically using the Wilcoxon test ($P < .05$) to compare brain function before and after denture adjustment. ***Results:*** In the left lobus parietalis cerebri

region of 21 subjects, the Z score values showed an increase in 16 subjects and a decrease in 5 subjects after denture adjustment. However, the Z score values of the neuronal activity of all 21 subjects significantly increased after adjustment ($P < .05$). ***Conclusion:*** Because the left lobus parietalis cerebri region corresponds to the sensorial area, it was suggested that improvement in masticatory function and oral sensation results from denture adjustments. Consequently, brain function would be more activated in the sensorial areas.

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The Effects of Molar Teeth Extractions and Implant Placement on Motor Cortex Neuroplasticity and Associated Behavior in Rats

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Purpose: Dental extraction and subsequent implant treatment have become a standard of care for teeth with questionable prognoses. Many patients undergoing intraoral surgery develop postoperative altered sensations including pain that may affect their motor function. Experimental manipulation of peripheral somatosensory inputs and motor outputs can induce neuroplastic changes within the primary motor cortex (MI) manifested as functional reorganization of motor representations. The aims of this study were to determine whether molar teeth extraction or implant treatment are associated with altered nociceptive behavior and MI neuroplasticity manifested as altered motor representation of jaw and tongue muscles within the cytoarchitectonically defined MI. ***Methods and Materials:*** Rats (n = 18) had their right maxillary molars extracted under local and general anesthesia. Under ketamine anesthesia, systematic intracortical microstimulation (ICMS) mapping of the left MI was undertaken 4 or 8 weeks after extraction in groups Ext1m (n = 6) and Ext2m (n = 6), respectively. Four weeks after extraction, an implant group (Imp, n = 6) underwent implant surgery and insertion of 1 to 2 nonsubmerged titanium screw implants in the maxillary M1 to M2 region, and then ICMS 4 weeks later. Naive rats (n = 7) had neither anesthesia nor surgery, and underwent MI mapping 4 to 8 weeks after arriving at the vivarium. Rats were monitored daily for behavioral changes (eg, eating, weight, grooming). Standardized nociceptive testing used von Frey filaments to examine escape responses to mechanical stimulation of the vibrissal pad areas. Dental implants were assessed clinically and histologically for evidence of osseointegration. The number of histologically defined MI sites from which ICMS evoked electromyographic activity in jaw, tongue, forelimb, and neck muscles reflects each muscle's cortical motor representation. Statistics used analysis of variance followed by post hoc analysis with Bonferroni adjustment as appropriate ($P < .05$). ***Results:*** In comparison with naive rats, extraction and implant groups had significantly decreased ipsilateral behavioral withdrawal thresholds during the first postoperative week that returned to preoperative levels 2 to 4 weeks later; at 4 to 8 weeks following extraction, increased thresholds were noted. In comparison with naive rats, extraction was associated with significantly decreased jaw and tongue motor representations within the MI 4 and 8 weeks later, while replacement of the extracted teeth with implants was associated with significantly increased jaw and tongue motor representations and increased overlapping of jaw-tongue-limb-neck motor representations 4 weeks later. ***Conclusion:*** Molar extractions and subsequent implant placement are associated with changes in rat nociceptive behavior as well as with MI neuroplasticity that may be related to the animal's ability to adapt (or not) to the altered oral state. (This study was supported by CIHR grant no. MOP4918.)

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