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SPQR: Simplification, Predictability, Quality to achieve Results

Osseointegration with New Bone in Sinus-lift and Simultaneous Implant Placement

- An Experiment using Canine Frontal Sinus -

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Objective: The purpose is light-microscopically to observe osseointegration with new bone developed in the space under the lifted sinus membrane in sinus lift procedure and simultaneous implant placement without bone substitute using canine frontal sinuses.

Method: In total, 24 implants (16 HA coated titanium implants; HA group and 8 rough surface titanium implants; RS group) were used in six female beagle dogs. Two implants per dog were placed along the central wall in the left frontal sinus for a duration of 6M and 2 in the right sinus were for 3M. HE stained undecalcified specimens were prepared. Then, histological observation and histomorphometric measurement were performed.

Result: The width of pre-existing wall bone was thin (1.1 ㎜ on average) in both groups. New bone developed from pre-existing wall and it covered most of the implant in the space under the lifted membrane at 3M. However, it shrank most and a little new bone remained around the implant at 6M under low magnified observation in both groups. Under high magnification, a thin layer of osseointegrated new bone remaining on the implant surface was observed in HA group. In this group, the rate of osseointegrated new bone covering the implant surface at 6M (78.5%) was more than at 3M (64.3%). The height of osseointegrated new bone from the wall at 6M (9.7 ㎜) was similar at 3M (9.1 ㎜). The bone-implant contact rate (BIC) of osseointegrated new bone at 6M (79.9%) was high and similar at 3M (79.9%). On the other hand, in RS group, new bone developed also and covered around half of the implant (49.0% at 3M and 42.0% at 6M). The height was comparatively high (7.3 ㎜ at 3M and 6.8 ㎜ at 6M). They were similar to HA group. However, osseointegration of new bone was minimal. The BIC was 3.8% at 3M and 0 at 6M.

Conclusion: In this experiment, the conditions (simultaneous implant placement, without bone substitute, minimal pre-existing bone) of sinus lift were severe. However, in HA group, osseointegrated new bone covered most of the implant in the space at 3M and it still remained at 6M. We concluded that HA implants induce superior osseointegration with new bone and also remained for a long time despite severe sinus lift procedure.

Key words:

Sinus floor elevation、simultaneous implant placement、no grafting 、new bone、osseointegration