Gaussian Regression Analysis of Drilling Protocols for Dental Implantation Surgery

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Investigations on the drilling protocols used in dental implantation surgery was performed, making use of the assumption that the drilling process pass through two different types of bone structures (dandelion and swine bone) having different constant friction parameter. Cylindrical drills were tested for two protocols (A and B) and two types of cone drills (groups C and D). Drilling process was therefore carried out in a homogeneous material with constant friction parameter and the angle speed of drilling was also constant, hence the drilling moment is a linear function of the elapsed time of drilling. The best fit pattern of each experiment was determined using mean-square minimization, data smoothing performed to establish typical patterns and construction of splines to obtain interpolation formulas. The stretched spline functions were used to produce average curves representing typical patterns. We verified that the clusters had insignificant changes even when calculated with smoothed data as the prior groupings could be constructed almost perfectly.