

ABSTRACT

Aim: To radiographically evaluate and compare the deflection characteristics of self-drilling titanium alloy mini implants when inserted into bone similar to the human mandible.

Method: 80 self drilling titanium alloy implants of the following sizes were used: 1.3mm, 1.4mm, 1.5mm and 1.6mm diameters and 10mm, 8mm, 7mm and 6mm lengths. 5 mini implants of each of the possible combinations of lengths and diameters were tested for study. The implants were inserted perpendicularly into bovine rib bone held in a custom made stand. The rib bone was made into segments 1.5cm wide using an osteotome and embedded in autopolymerising acrylic resin blocks with four bone segments in each block. Thus a total of twenty resin blocks were made. Insertion torque was set at 1Kgf in the long handle implant driver with attached torque gauge. Each resin block contained one implant per bone segment and individual blocks contained implants of identical lengths but varying diameter. The resin blocks were then radiographically exposed and the deviation of the long axis of the implant from a true vertical line drawn through the centre of entry of the implant into cortical bone was measured.

Results: There was an increase in deflection of the mini implant with increase in length. On the other hand, increase in diameter resulted in decrease in the amount of deflection observed.

Conclusion: Selecting an implant depends on anatomical limitations like cortical bone thickness, proximity to adjacent roots, or any other vital structures and implant design. For insertion into thicker bone such as the mandible, it is preferable to use a thicker and shorter mini implants as they exhibit lesser deflection. In areas of lesser cortical bone, a thinner and longer mini implant can be considered as the resistance offered by the bone will be lesser.

Keywords: Mini implants, mechanical properties of implant materials, deflection, risk factor