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RESEARCH ARTICLE

HOW TO MEASURE SCREW LENGTH USING DRILL BIT

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ABSTRACT

It is seen that while treating fractures surgically using plating one of the challenge is to measure exact screw size to fix the fracture. Various modalities are being practiced like use of depth gauge, (Williams and Roaf, 1973) fluoroscopic guidance and clinical experience. Our study shows that among all methods used, there is one more method that we are using since 3 years (2014—2017) has much more reliability and also no need of any external appliance to depend upon. The method named by us as drill bit method proved to be very much reliable in assesessing exact screw length.

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INTRODUCTION

Plating in orthopedic surgeries has revolutioned the branch by providing anatomical reduction and rigid fixation (Anderson *et al*., 1975). Postoperative radiograph assessment mainly focuses parameters like reduction of fracture and stability of fixation. Stability is provided by bicortical purchase of screw (Uhl, 1989). It is seen that the fear of bicortical purchase many times leads to long or short screw insertion. The error occur mostly due to misinterpretation by depth gauge. On fluoroscopic assessment if size found to be wrong then replacing by another screw make the hole wide and thus loosening of screw and affecting fracture stability (Chao and Aro, 1991).

MATERIALS AND METHODS

The study was conducted in postgraduate department of orthopaedics GMC Jammu. All subjects undergoing fixation using plating technique were subjected to screw length measurement using drill bit method. No depth gauze or fluoroscopy was used for assessing screw length. The technique was used only for assessing screw length in diaphyseal region of bone. (Müller *et al*., 1990; Schatzker and Tile, 1980; Behrens, 1989) The technique can be applied in any long bone like humerus, radius, ulna, femur, tibia, metacarpal shafts.

It has no role in cancellous bones and metaphyseal region of bone. Results areassessed in terms of accuracy of screw length in postoperative radiographs. Cases with pathological bones and wide osteoporosis are excluded from study.

Technique: It involves the measurement of screw length without the use of depth gauze or fluoroscopy. The method involves the above mentioned steps.

Step 1: Using the drill and sleeve, first cortex is drilled and as the second cortex is reached further drilling is stopped.

Step 2: If the drill bit has any markings over it read the mark on drill bit when second cortex hits. If drill bit has no markings remove the drill bit once second cortex hits.

If drill bit has markings over it then after reading mark continue to drill. Once drill bit is removed apply sleeve over drill bit and reach the marking read during hitting of second cortex. The drilling part of drill bit unexposed by drill sleeve is measured as distance X mm. (X-arbitrary used). If drill bit has no markings over it then remove the drill bit after drilling one cortex as it hits the second cortex. Use K-wire and measure the drilled distance equal to distance of K-wire inside bone. This is equivalent to distance X.

Step 3: Now screw length can be found easily by using distance X, which is equal to X+2mm in case of small bones like metacarpals and forearm bones and X+4mm in case of bones like humerus, femur and tibia.

DISCUSSION

It is seen that the technique is very reliable in calculating the screw length without use of any depth gauze and fluoroscopy. As the technique is very much sensitive with little scope of error as encountered with depth gauze due to improper fitting across bone. The technique is proved to be very effective in routine surgical workup in treating diaphyseal fractures like humerus shaft, forearm bones, metacarpals, phalanges, femur shaft and tibia diaphyseal fractures. The technique has drawback in cancellous metaphyseal zone of bone like proximal humerus (head of humerus), distal humerus, proximal ulna, distal radius, pelvic bone, trochanteric area, distal femur, tibia plateau and pilon, talus and calcaneum where second hit cannot be appreciated. Surgeon precision to judge the reach of second cortex is main dependent variable. High speed drills to be avoided in procedure as using these appliances causes difficulty to appreciate second cortex.

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