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Are all internal fixation methods equivalent?

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Management of open tibia fractures is a great challenge for orthopaedic surgeons due to the high risk of infection. The situation of soft tissue can dictate the fixation method towards external fixation but this belief is also challenged by recent papers (1). Internal implants can get contaminated due to the residual bacterial load despite proper debridement and also create a surface for biofilm formation (2). Different antibiotics regimens are described according to the type of open fractures and external fixators can become a choice of fixation as they are able to provide a fracture site without any implant that can predispose the area to biofilm formation. However, their performance in terms of stability is also an area of concern.

FIXIT trial (3) provided an important contribution to the management of open tibia fractures. The authors successfully designed a randomized controlled study including multicenter contributions. The randomization included open tibia shaft fractures which were either type IIIA or type IIIB. 127 patients received circular external fixation, while 133 patients received internal fixation. The most striking outcome was the higher probability of “at least one major complication (amputation, infection, a soft-tissue problem, nonunion, malunion, and a loss of reduction/implant failure)” in external fixation group (62.1%) compared to the internal fixation (43.7%) (p=0.005). The most notable difference was in “loss of reduction/implant failure” which was higher in external fixation group with a risk difference of 14.4% (p=0.002), while no appreciable difference could be detected regarding other types of complications. The results were interpreted as the inferiority of external fixation in the management of open tibial fractures and the authors recommended against the routine use of modern external ring fixation.
These results are important as they provide level I evidence that is obtained after a multicenter hard work. However, the study design brings up several concerns. The authors included both plating and intramedullary nailing in the same group of internal fixation, and also Ilizarov and Taylor spatial frame in the external fixation group. Although the latter can be justice since the biomechanics behind Ilizarov and Taylor spatial frames are similar, plating and intramedullary nailing are two distinctive fixation methods both biomechanically and surgically. Intramedullary nails act as a load-sharing implant while plates possess load-bearing nature. In addition, the insult to soft tissue widely differs not only between intramedullary nails and plates but also between different plating techniques including minimally invasive and open approaches. Moreover, the plate-screw construct can also show biomechanical variations depending on the choice of screws whether locking or non-locking. Thus the literature strives not only to compare internal versus external fixation but also the mentioned subgroups (4,5). Therefore, it might not be justice to conclude the superiority of all internal implants in terms of general complication rates. Also, as we don’t have information on what percentage of deep infection belonged to the plating subgroup, analyzing the subgroups separately can reveal significant differences between three different fixation methods since the literature has some evidence regarding better infection control in intramedullary nailing compared to plating (6). When the conclusion of the study, claiming that internal fixation methods are superior to external fixation, is considered; the available methodology and results do not

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necessarily prove that plating or nailing is superior to external fixation. Moreover, supplementary material does not also indicate whether minimally invasive or open approach was the preferred method, which prevents making any conclusion about the favored approach for plating.

Overall, FIXIT study can extinguish the myth which prevents the surgeons from putting internal fixation to open fractures, but does not necessarily preclude the use of external fixation and does not provide a clue about whether it is plating, nailing, or both that is superior to external fixation in the management of open tibia fractures.

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