ADVANCED TECHNIQUE OF BONE TRANSPORT TO SOLVE THE SEGMENTAL BONE DEFECT IN LONG BONE

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ABSTRACT

Large segmental defect may occur in the long bone from various reasons including trauma, infection, and tumor. The critical sized bone defect of the long bone may be treated in several ways, including the use of autogenous iliac bone graft, vascularized fibular graft, and bone transport using Ilizarov external fixator. Induced membrane technique has shown a successful bone regeneration which needs a considerable amount of autogenous graft. But this technique requires a significant morbidity of donor site, and the time taken to incorporate the graft may be lengthy. Vascularized fibular graft is a technically demanding procedure, which needs a skillful vascular surgeon. Moreover, it often associates the high rate of stress fractures or nonunion until the complete healing. Bone transport using an external fixator has become a standard method to reconstruct e a large segmental defect of extremities. It has many advantages including the unlimited amount of bone regeneration, the capacity to correct the deformity, and the early weight bearing. Although distraction osteogenesis provides a highly satisfactory means of reconstructing segmental tibial defects, prolonged use of an external fixator is difficult for patients, and complications are almost inevitable, such as pin-tract infections, resulted deep infection, and joint contractures. To reduce the period of external fixation, hybrid bone transport techniques has been developed. Bone transport over the nail (BTON) reduces external fixation times because the fixator can be removed before the distraction callus has consolidated. However, it requires union of the docking site before the fixator is removed, regardless of the addition of bone graft or the use of compression osteosynthesis. Moreover, there is a risk of developing deep infection leading to failure of the treatment, which could result from the close contact between the nail and the pins and wires. The positioning of the external fixator pins or wires around an IM nail at the diaphysis is difficult, given the limited space available. BTOP (bone transport over the plate) is another hybrid technique, using a plate (BTLP) and external fixator. This new method is safe with low complication rate including the risk of re-infection. It may be used when the nail is not available in the pathologies of segmental bone defects. The indications may be the short proximal or distal segments in the long bone fractures, in which the nail fixation is not sufficient to stabilize or makes the additional deformity. Also, the segmental bone defect in upper extremities is another indication, as the nail is not easy to fix. Given that the time required for external fixation was significantly shorter, BTOP technique is a more attractive option than the BTON technique.