Minimally-Invasive Bone Graft Harvesting Technique Without Sophisticated Instruments

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Abstract

Bone graft is required for various reconstructive orthopedic procedures. At times, a small amount of cancellous bone graft is required, especially in hand and upper limb surgeries. We describe a minimally invasive technique to harvest bone graft from the iliac crest that may help reduce the morbidity associated with the procedure. This technique uses simple instruments readily available in any orthopedic operation theater.

The role of bone graft is well established in various orthopedic surgeries.[1,2] The iliac crest is a favored site of procuring the bone graft as it is easily accessible and a good amount of cancellous bone can be harvested, however, donor site morbidity remains a worrisome issue.[3,4] Various techniques of harvesting bone graft have been described in the literature.[1,2,5,6] The technique of minimally-invasive graft harvesting involves expensive modular trephines that may increase hospital costs. We describe a minimally invasive technique to harvest the bone graft without the need for sophisticated instruments. The patient provided written informed consent for print and electronic publication of this case report.

Surgical Technique

We used this minimally invasive technique of harvesting bone graft in various hand- and upper-limb reconstructive procedures, where a small amount of graft was required. The iliac crest is cleaned and draped in the anesthetized patient. Using a No. 15 surgical blade, a small (approximately 2 cm) bone-deep skin incision is made over the iliac crest approximately 4 cm lateral to the anterior superior iliac spine to avoid injury to the lateral femoral cutaneous nerve.[7] Small hook retractors are introduced to optimally utilize the exposure and identify the center of the crest. A small square bone window is then created using a fine 5 mm osteotome. Tap sleeves of various diameters are readily available in all orthopedic theater of any set-up (**Figure 1**). A sleeve of appropriate size is chosen depending on the size and quantity of the bone graft required. The sleeve is then held over the bone directing along the obliquity of crest (**Figure 2A**). It is advanced until approximately 3 cm depth is reached with gentle twisting movements of the hand to avoid the wobbles. On withdrawal, a core of cancellous bone is trapped within the sleeve. The cylindrical cancellous bone is pushed out from the sleeve using the blunt end of a Steinmann pin of appropriate size (**Figure 2B**). If required, the sleeve is reinserted through the same window but in a different direction along the crest. Four to 5 cylindrical cancellous bone cores can be obtained in the similar fashion from 1 bone window. The square bone plug is then repositioned over the window. Skin closure requires a couple of sutures.

Discussion

Bone grafting is one of the most common procedures performed in ortho-

Figure 1. Various sizes of commonly available drill sleeves and tap sleeves.

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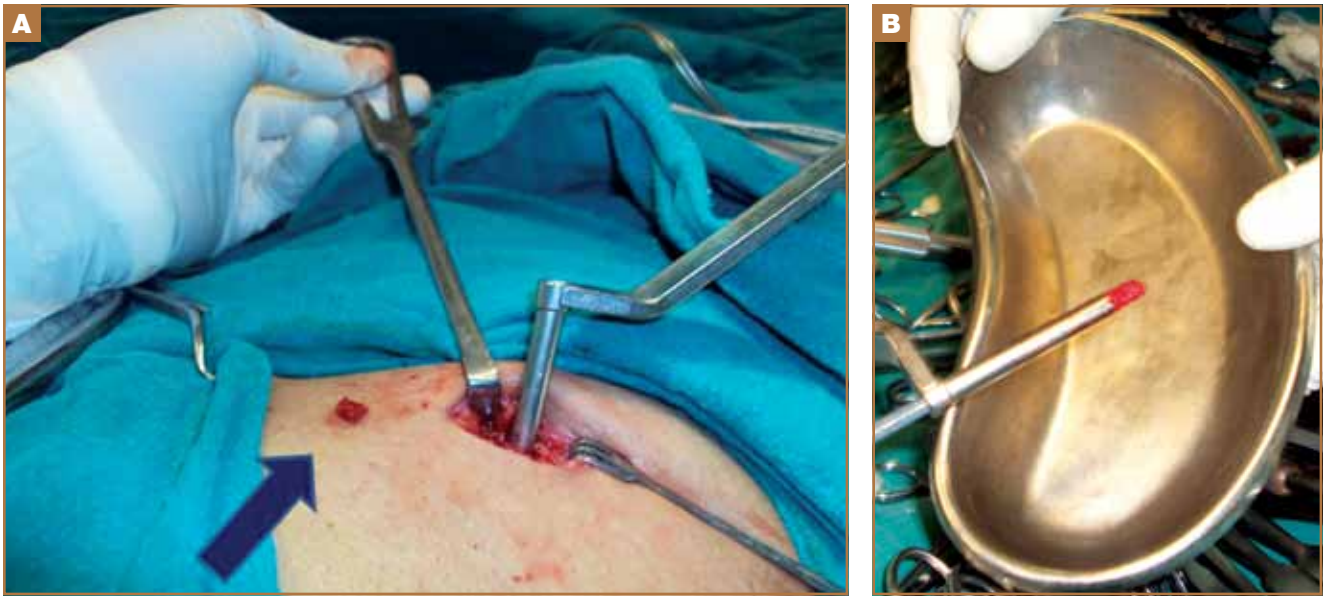

Figure 2. Iliac crest has been approached with a small incision. A small window (arrow) has been opened using 0.5 cm fine osteotome in the middle of crest. Sleeve is being used to harvest cancellous bone graft (A). A cylindrical shaped cancellous bone graft being delivered from the sleeve (B).

pedic surgery.[1,2] The procedure of bone grafting is well established before "the metallurgic age" of orthopedic surgery. Autograft is always desirable as it is osteogenic, osteoconductive, and osteoinductive. Its use eliminates graft reaction and transmission of viral infections.

Hand and upper-limb orthopedic procedures require, at times, a small amount of bone graft. Minimally-invasive techniques of harvesting the bone graft have been reported to be associated with less postoperative pain, local tenderness, discomfort on walking, and sensory disturbances.[3]

Various sophisticated instruments are now commercially available that are quite expensive. Access to such instruments may not be possible in every set-up, especially at a peripheral setting where only basic essential facilities are provided. Our technique requires tap sleeves that are readily available in all orthopedic operation theaters. Apart from availability, another advantage of this technique is that no additional cost-factor is involved with it. We have been using the described technique for years without any complications. In our opinion, the donor site morbidity may possibly be reduced by minimally-invasive technique of harvesting the graft.

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