A practical method to improve grip upon a surgical hammer during the conduct of hip joint arthroplasty

Patrick Weinrauch 1,2,3, Myriam Deshon 3

1) Brisbane Hip Clinic, Queensland, Australia  
2) School of Medicine, Griffith University, Queensland, Australia  
3) St Andrews War Memorial Hospital, Queensland, Australia

ABSTRACT

We describe the application of a self-adhesive elastic bandage to the handle of surgical hammers to improve the Surgeons handgrip for the impaction of acetabular implants during hip joint reconstruction. We have found this technique particularly useful for the impaction of more rigid acetabular implants in patients with harder bone, such as typically encountered during hip resurfacing arthroplasty.

KEYWORDS

Hammer, Grip, Self-adhesive bandage, Coban, Hip, Arthroplasty

INTRODUCTION

Secure primary fixation of uncemented prostheses in hip joint arthroplasty requires sufficient interference fit to prevent motion at the implant-bone interface during early post-operative axial and rotational loading. For acetabular reconstruction, press fit implants principally obtain primary fixation by “rim fit” purchase obtained upon the relatively hard cortical bone of the acetabular edge. Rough prosthetic surface textures [1], macroscopic prosthetic design features such as anti-rotation fins/ screws and the surgical preparation of acetabular bone by under-reaming relative to implant diameter [2] assist in obtaining reliable primary fixation. When these methods are employed, reasonable impaction force is typically required to obtain both optimal rim fit and also complete acetabular seating. In particular, this applies to the use of more rigid acetabular implants and in patients with harder bone, such as typically observed during hip resurfacing arthroplasty.
In selection of instrumentation for acetabular reconstruction, it is our preference to use a larger, heavier hammer to deliver sufficient impaction force whilst maintaining accurate control of implant orientation. We have observed however that hammers of larger mass may become difficult for a Surgeon to grip while impacting the acetabular implant, particularly when the handle becomes slippery. We present a practical method to improve a Surgeon’s grip upon the hammer should this occur.

METHOD

Coban (3M, North Ryde, Australia) is a self–adhesive elastic bandage traditionally used for the treatment of venous ulcers or as a general dressing after limb surgery. The bandage is a porous, non-woven polyester and is presented sterile within individually wrapped packaging.

Using moderate tension during application, 4-inch width Coban bandage is wrapped around the mallet handle as desired (Fig. 1). The applied Coban dressing is rough in texture and provides the Surgeon with excellent grip upon the hammer during acetabular impaction, even in the presence of slippery body fluids such as fat, blood and bone marrow.

The material properties of Coban bandage make it ideal for this application. As the bandage is self-adhesive it sticks to itself without requirement for the use of additional tape or pins. The combination both self-adhesive and elastic properties result in a handle covering that remains secure during use and does not loosen after application.

DISCUSSION

Successful uncemented acetabular reconstruction requires a combination of secure fixation and accurate three-dimensional implant orientation with consideration of appropriate axial seating, anteversion and abduction angles. While incomplete acetabular seating with a small polar gap does not necessarily impact upon implant survivorship if sufficient rim fit is obtained [2-7], complete seating does however increase the implant-bone contact surface area, potentially influencing both primary stability [8] and secondary porous osseointegration. While over-vigorous acetabular impaction is seldom necessary and may risk intra-operative peri-prosthetic fracture [6], achieving appropriate primary stability and implant seating typically does require moderate force to be applied during impaction. As hammers with larger mass allow the Surgeon to deliver the necessary force at a lower swing velocity, we consider that they deliver a more controlled method of acetabular impaction, being both easier to achieve impaction and enabling more consistent implant orientation. The use of hammers with greater mass do however require better grip upon the instrument during use, which may be compromised by the presence of body fluids.

SUMMARY

We present the application of a self-adhesive elastic bandage to the handle of surgical hammers of larger mass to improve the Surgeons handgrip for the impaction of acetabular implants during hip joint reconstruction.
REFERENCES


