

## Gauze Strip Tourniquet for Nail Surgery

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### ABSTRACT

All nail surgical procedures require the use of a tourniquet. The nail bed, being a very vascular structure, needs to be exsanguinated at the start and then a tourniquet needs to be tied at the base. A number of tourniquets have been described, including a Foley's catheter, a Penrose drain, a rubber strip or a rubber band. The present article explains the use of the easily available, improvised, gauze strip tourniquet. This does not require much special preparation, is easily autoclavable, perfect for single use and can achieve exsanguination as well as tightening as a single step. This technique does not require much learning and is easily reproducible in almost all surgical setups.

**KEYWORDS:** Exsanguination, nail surgery, gauze strip tourniquet

#### REC Review:

Risk : 1	0 = maximum risk,	5 = least risk
Efficacy : 5	0 = minimum efficacy,	5 = maximum efficacy
Cost : 5	0 = very expensive,	5 = least expensive

Optimal nail surgery requires a complete knowledge of the anatomy and physiology of the nail unit. Nail structure peculiarities make nail surgery more complicated and prone to bleeding and scarring. <sup>[1]</sup> The nail derives its blood supply from the lateral digital arteries, which give rise to numerous branches and proximal and distal arcades, which anastomose extensively. <sup>[2]</sup> This ensures continuous blood supply even in the event of few vessels getting damaged as well as during complete range of motion of the distal interphalangeal (DIP) joint. <sup>[3]</sup> This is also essential to aid in maintenance of body temperature through the large number of arterio-venous anastomosis and glomus bodies present in the nail bed.

On the flip side, this rich vascularity of nail bed becomes a bane for the operating surgeon. Even

minimal manipulation leads to extensive bleeding and rapidly obscures the operative field. To add to this, plain lidocaine without epinephrine is generally recommended for digital anaesthesia, which compounds the problem because plain lidocaine is itself a vasodilator, and absence of epinephrine makes matters worse.

To overcome this difficulty, exsanguination and tourniquet are two recommended steps in nail surgery. Exsanguination involves drainage of blood from the distal to the proximal part of the digit. This is recommended, but may be optional before operating. This is followed by tying a tight tourniquet at the base of the digit to prevent any re-accumulation of blood. Various materials are recommended for this purpose. These include rubber strip tourniquet, <sup>[4]</sup> rubber tube tourniquet, 1 inch Penrose drain, <sup>[5,6]</sup> 3/8 inch Penrose drain with a straight hemostat, <sup>[7]</sup> urinary (Foley's) catheter, etc. However, certain practical problems arise with the use of these tourniquets. Some authorities have even recommended that nail surgery could be performed without a tourniquet if an assistant puts digital pressure on the sides of the middle part of the proximal phalanx. This may be easier but not always practical for surgeries lasting longer.

An ideal material for use as tourniquet should not be thin, twisted and constrictive like a rubber band. It should be sterile as it comes in close contact with the operative field. The use of hemostat to secure the tourniquet at the base may also interfere with the

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operative field or may loosen out during the procedure. The movement and manipulation of the digit during surgery is also restricted by attaching a hemostat at its base.

To overcome these difficulties, we devised, refined and standardised the use of sterile operative gauze for exsanguination as well as tourniquet during nail surgery. A 25-inch long piece of autoclaved gauze is folded on itself to form a flat strip (half-an-inch wide). The strip is then used to exsanguinate the digit, if deemed necessary. It is wrapped tightly around the digit from the distal to the proximal end, achieving extravasation. For this, each loop should partially overlap the previous loop [Figure 1]. When the base of the finger is reached, two extra loops are wound to secure the strip at the base [Figure 2]. Thereafter, we start unwrapping from the distal end till we reach



**Figure 1:** Gauze strip tourniquet being wound from the distal to the proximal end of the digit. Care is taken to overlap each loop of the tourniquet over the previous loop, helping in extravasation



**Figure 3:** The gauze strip is then unwound from the distal to the proximal end. Note that the proximal free end of the tourniquet is held tightly at the base

the lower 1/3<sup>rd</sup> of the digit [Figure 3]. At this stage, both the free ends are tied in a secure knot to form a tourniquet at the base of the finger [Figure 4]. The gauze strip should not be allowed to roll or create localised pressure (Video online).

Tourniquet use has been recommended for variable intervals from 10 min to 30-60 min.<sup>[5]</sup> In our experience, we have safely used the tourniquet for 20 min at a stretch without any complications. For longer procedures, the tourniquet can be intermittently loosened and then tied tightly at the base.

The use of gauze strip tourniquet offers several advantages over the other tourniquets described. The requisite gauze strips are cost effective and easily available with every surgeon and do not require any



**Figure 2:** The digit has been extravasated and the two extra loops of the tourniquet are wound at the base of the digit so as to firmly secure the tourniquet



**Figure 4:** Both the free ends of the gauze strip are tied into a knot to firmly secure the base of the tourniquet. The extra piece of gauze can be cut off. This enables easy manoeuvrability of the digit during the procedure. Note the blanching of the digit as compared with the other digits

special procurement of material or sterilisation. The gauze pieces cut to requisite size can be easily sterilised with the other smaller gauze pieces required for surgery. The used strip tourniquet can easily be disposed off after each patient and no reuse is performed. The strip is easy to make then and there, not requiring any special skill. Being a flat strip, it does not cause uneven or undue pressure on the underlying digital nerves or arteries. Above all, a knot and not a haemostat hold the tourniquet at the base, helping in maintaining easy manoeuvrability of the digit during surgery. It also avoids chances of accidental slippage of tourniquet during surgery. This versatile tourniquet has been used by the author for more than 15 years of dedicated nail practice without any difficulties.

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