

Surgical Technique



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Dr. Md Zafar Iqbal



Dr. Anil Agarwal



Dr. Sunny Bhalla

Address of Correspondence

Dr. Md Zafar Iqbal,

Senior Resident, Department of Paediatric Orthopaedics,
Chacha Nehru Bal Chikitsalaya, Geeta Colony, New
Delhi, India

E-mail: docmdzafariqbal@gmail.com

¹Department of Paediatric Orthopaedics, Chacha Nehru
Bal Chikitsalaya, Geeta Colony, New Delhi, India

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The Gliding Surgical Drapes Near the Periarticular Region: A Potential Source of Surgical Contamination

Md Zafar Iqbal^{MS Ortho}¹, Anil Agarwal^{MS Ortho}¹, Sunny Bhalla^{MS Ortho}¹

Abstract

In surgeries involving joints and the adjacent area, maintaining a sterile field is essential for preventing postoperative infections. The responsibilities are heightened when the joint is required to be exposed. An often-overlooked source of contamination is the gliding motion of the drapes from manipulation of the limb during surgery. We found the movement akin to the tendon glide in contaminated animal bites, where movement draws pathogens deep into the joint, increasing the infection risk. This article presents a practical tip: recognizing this gliding drape as a surgical contaminant and suggesting methods to prevent it.

Keywords: Surgical drapes, Human/Animal bite, Contamination, Sterility

Introduction

Periarticular and joint surgeries are common in children and adolescents due to various pathologies and often performed under tourniquet control [1, 2]. We recognized a potential source of surgical area contamination due to gliding movement of surgical drapes over the tourniquet.

The Problem

Limb surgeries are often performed under tourniquet control to minimize blood loss and provide a clear surgical field. The thickness of the pneumatic tourniquet makes the proximal limb appearance mimic a tapering cylinder (Fig. 1). Further, the material of the tourniquet is often low friction. The tourniquet width, the short limb size, or the surgical requirement may mandate that the drapes are applied very close to the tourniquet margin. Additionally, the drape locks are typically applied when the limb is in extended position.

With flexion and extension of the joint (especially the knee), the limb's circumference, and surface alignment change, which may cause the drape overlying the tourniquet to glide. When not firmly fixed in place, this drape may come in contact with tourniquet margins in limb flexion or expose underlying non-prepared skin to the surgical field. Subsequent upon joint extension, this section of drape then rolls back into its original position potentially contaminated (Fig. 2).

Clinical Analogy

This phenomenon is analogous to what may be seen in human/ animal bites near the joints [3]. In such cases, even a superficial bite over a joint can lead to deep-seated infection. This occurs because the tendons contaminated at the bite site glide within their sheaths into deeper, previously uncontaminated compartments of the joint (Fig. 3). The poorly secured drape may exhibit a similar phenomenon of sliding over the non-sterile tourniquet with limb flexion and migrating back with contamination on limb extension.

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Figure 1: Schematic diagram of thigh with the tourniquet; proximal thigh appearance mimics a tapering cylinder due to limb characteristics and wrapping of tourniquet.

Proposed Solution

To prevent this, it is recommended that the drapes be properly secured over such regions. It is recommended to reinforce the drape securing by either of the following methods:

1. Suture fixation: A suture can be placed at the drape edge anchoring it to the skin (Fig. 4a & 4b).
2. Surgical tape: An adhesive surgical tape can be tightly wrapped around the drape edge which covers the tourniquet. Alternatively, a drape with an adhesive margin can also be used for this purpose (Fig. 4c & 4d).

Discussion

In limb surgeries, especially periarticular surgeries, pneumatic tourniquets are often indispensable, despite being a non-sterile element. Emerging evidence suggests that tourniquets used in



Figure 2: Image depicts how the drape glides proximally as the knee is flexed. On knee extension, the drape glides back to the sterile field. The original margin of the surgical drape is depicted with a marker line.

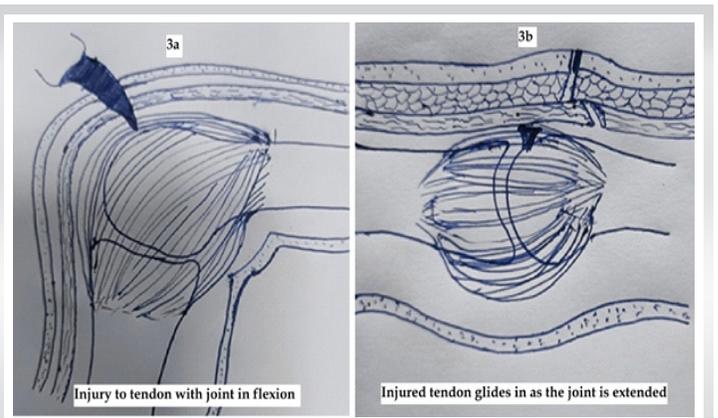


Figure 3: shows the spread of contaminant after human bite by excursion of the extensor tendons during joint movement (shown here is example of human bite over metacarpophalangeal joint).

orthopaedic procedures may be a potential source of contamination, leading to increased risks of cross-infection, wound issues, and implant-related infections [4]. Ahmed et al [5] obtained culture swabs from 20 pneumatic tourniquets which were regularly used in orthopaedic procedures, and found that they were contaminated with colony counts ranging from 9 to >385 including methicillin resistant Staphylococcus. Walsh [4] and Mufarrih [6] also found similar colonization of the tourniquet in their studies.

We observed that surgical drapes overlying the tourniquet tend to shift or glide along the limb as the joint is moved through a range of motion. This movement poses a significant risk of compromising the sterile field, as the drape movement may



Figure 4: Intraoperative image of methods of securing surgical drape; a & b: Despite joint movements, the drape does not glide beyond the marked line keeping surgical field uncompromised; c & d: securing the drape with an adhesive edge.

potentially drag microorganisms from the surrounding skin or from the colonizing organism from the tourniquet itself, into the surgical site. Consequently, this could lead to an increased risk of surgical site infections.

We could decipher a striking similarity between the observed phenomenon of such drape movements and the contamination patterns seen in tendon injuries resulting from animal or human bites. Both scenarios, whether it is the tendon gliding through its sheath or the drape shifting along the limb, appear to facilitate the spread of contaminants [3].

We suggest a simple yet effective approach to address the issue of drape-tourniquet related contamination. Securing the drape by either suturing it to the skin or applying an adhesive sterile

tape around the drape that covers the tourniquet. This will prevent the tourniquet from gliding and hence reduce the risk of contamination.

Conclusions

Securing the tourniquet is a small but important step to ensure surgical field sterility. Drawing from our understanding of tendon glide in bite-related joint infections, this tip serves as a reminder of the importance of anticipating and mitigating contamination risks introduced by limb manipulations during surgery.

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Declaration of patient consent : The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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