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# Introductory Chapter: Novelty Meets Tradition

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## 1. Introduction

Male circumcision has been practiced for centuries by different cultures; nowadays, it is considered one of the most commonly performed surgical procedures worldwide. The oldest picture depicting circumcision dates back to 2300 BC in ancient Egypt; it was considered a symbol of pledge between God and Abraham [1].

Apart from cultural and religious perspectives, circumcision is performed for medical reasons including preventing sexually transmitted diseases, recurrent urinary tract infections, phimosis, and balanoposthitis [2]. In 2007, the World Health Organization (WHO) recommended the practice of youth and adult circumcision as an effective method to prevent the transmission of Human Immunodeficiency virus (HIV) in high endemic areas [3].

There are different circumcision techniques described in the literature. The WHO manual on male circumcision recommends mainly three adult and four pediatric techniques for circumcision. The sleeve resection, surgical dorsal slit, and forceps-guided are advised for adults, whereas the Plastibell method, Mogen and Gomco clamps, and the dorsal slit technique are advised for the pediatric population [4].

## 2. Novel techniques for male circumcision

Currently, circumcision is performed using different techniques depending on instruments availability and surgeons' expertise. Most commonly utilized circumcision methods include Gomco clamp, Mogen clamp, Plastibell, dorsal slit, and bone cutter. Ring circumcision devices such as Plastibell, Shang Ring, and other plastic rings are popular and are the preferred instruments for circumcision due to their ease of usage, they allow a less traumatic technique with a low complication rate and better cosmetic outcomes [5].

Advances in the medical field have brought into light new methods to perform male circumcision. These techniques permit more desirable clinical outcomes in terms of less morbidity for the patient, less to no pain, shorter procedural time, and better cosmetic outcomes.

Laser circumcision (LC) has recently received attention as one of the innovative techniques of circumcision. A high-intensity light beam is used to cut and seal the foreskin. There are various types of LC namely using heat, carbon dioxide, or neodymium as energy output. Neodymium: yttrium-aluminum-garnet (Nd-YAG) lasers permit accurate cutting while achieving hemostasis and minimal tissue damage [6].

Carbon dioxide laser beam is used in focused mode to resect a demarcated circumferential incision through the skin reaching the subcutaneous mucosa. Because of its thermocoagulation effect, hemostasis is reached by cauterizing the small blood vessels with surrounding tissue [7].

Heat energy Metzenbaum scissors can be used as an alternative to conventional clamps in which circumcision is performed using bipolar scissors to remove the foreskin and underlying mucosa and proceed with the frenulotomy, and then closure of the wound is achieved using synthetic sutures depending on the size and age of the patient [8].

### **3. Comparable overview of various techniques used in circumcision**

After circumcision, the penis is inspected for possible lacerations, bleeding, inflammation, hematoma, and edema. There are various factors that dictate potential acute complications including anatomical variances, patient's age, and surgical technique used.

Studies exploring complication rates of circumcision are sparse, but available statistics denote the overall complication rate of this procedure between 0.2 and 5% [9].

Traditional techniques such as dorsal slits and forceps-guided methods require more surgical expertise and procedural time than other traditional methods like Mogen and Gomco clamps, and Plastibell, which require shorter surgical time. Furthermore, they are easy to learn and perform. Less cosmetic satisfaction was noted using the dorsal slit method because of lack of symmetrical foreskin cutting [10].

Comparing the Mogen clamp and Plastibell method, studies have shown more risk of nonstandard amputation of the glans penis with the Mogen clamp, whereas Plastibell displacement can cause glans necrosis. However, higher risk of lacerations and bleeding was seen with Gomco clamp usage [11, 12].

The most common acute complication with the use of Plastibell is bleeding with a rate ranging between 2.5 and 4%. Paraphimosis is another complication of Plastibell technique attributed to the dislodgement of the plastic ring [13, 14].

The use of bipolar scissors for foreskin cutting in circumcision is comparatively new. Marsh et al. reported the first case of bipolar usage in 1995 [15]. Common acute complications of this procedure include bleeding, edema, erythema, hematoma, and pain [8].

Carbon dioxide laser-directed circumcision has been shown to provide adequate incision and hemostatic properties under the effect of small vessel cauterization. In addition, better cosmetic outcomes were noted with the use of laser and less postoperative pain compared to the conventional scalpel method [7].

### **4. Future perspectives**

Male circumcision can be safely performed at any age, but most of the procedures are done during infancy. That said, most of the procedures are done at an early age to maximize circumcision benefits and reduce possible adverse events [16]. Various techniques are used to perform male circumcision. When performed properly, surgical complications rate is low. Minor complications are noted between 0.5 and 1% when performed in infancy [17].

Current studies are directed at describing a technique that can achieve the best surgical and cosmetic outcomes for the patient and attempt to prevent transmission of HIV [18]. Traditional and novel techniques for circumcision are detailed in the literature in terms of proper usage, pros and cons of each technique, and efficacy of innovative methods compared to traditional ones. Few new techniques of circumcision are described in the literature, however, there is not enough data to compare their efficacy and safety profiles with the traditional methods, and hence they are not yet fully supported.

It is key for the healthcare providers to acquaint themselves with available procedures for male circumcision that can potentially deliver the optimal care and best surgical outcomes for boys and men seeking circumcision.

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