

A Comparison Between the Current Stainless-Reusable Tenaculum and the Modified Disposable Tenaculum

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ABSTRACT

Till 2015, all of the countries around the world specially developing countries should provide high quality reproductive health services for their population including gynecological surgeries, family planning programs and sexual health plans. Tenaculum is a medical device used for taking and holding body tissues during operation. In fact, This device is a kind of locking forceps which has been designed in a way that is put and locked in an intended place and fixes the tissue and helps to perform a surgery or other medical procedures. It also holds the tissue for manipulation. Current stainless-reusable tenaculum has some disadvantages which will disappear by using of modified disposable ones. This review article studies the role of these two types of tenaculum in procedures that fixation of the cervix is necessary. This is a review study of more than 20 articles and several text chapters. The articles were selected from the scholarly journals indexed in the accredited publications like PubMed, Elsevier, Scopus, DOAJ and Google scholar databases as well as Iranian journals of SID, Iranmedex and Magiran. The current stainless-reusable tenaculum has some disadvantages which are explained in this article. Therefore, authors of this article decided to design and produce modified disposable tenacula. This type of tenaculum is lighter and more flexible and has unique characteristics which reduce pain, bleeding and traumatizing of body tissues that are seen more common in use of stainless reusable tenacula.

Keywords: Stainless-Reusable Tenaculum, Modified Disposable Tenaculum, Cervix

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INTRODUCTION

Tenaculum is a medical device used for taking and holding of body tissues. This device is a kind of locking forceps which has been designed in a way that is put and locked in an intended place, fixes the tissue and helps to perform the surgery or other medical procedures. It also facilitates manipulation by holding the tissue.

Most of medical equipment factories produce tenacula in different models for variable uses. The history of using this device refers to 16th century. The tenaculum word is derived from the root tenacious which means holding. Tenaculum has long and thin handles which attach to two hooks at the end. These hooks cast anchor in the body tissues and enable the physician to lock the handles in a desirable direction [3]. One of the most important uses of tenacula is the procedures in which fixing the cervix is inevitable. Other indications include:

- 1- Taking the cervix and creating tension in the uterine length in gynecological and urological surgeries.
- 2- Prevention of uterine ostium movement during placing IUD (intra uterine device) in the uterus.
- 3- taking and holding the arteries in different surgical procedures.[5]

Cervical tenaculum can be made of metal which should be sterilized after each use or can be disposable and used for each patient once.

Tenaculum Types:

1-Stainless-reusable tenaculum:

It is a kind of cervical tenaculum used for gynecological surgeries. This device is made of stainless steel and resembles to a scissors which has two blades at the end. The applier should calculate its dents in the cervix and hold the tissue tightly with them. This can cause pain, bleeding and trauma to the cervix. Sometimes the surgeon should unfasten the tenaculum and put it in another position to allow the hystrometer enters in the uterine cavity. This procedure duplicates patient's pain and discomfort. Moreover current tenacula should be sterilized after each use though in the case of not observing sterilization principles can increase infection transmission rate. In addition reusable tenacula sterilization costs are not economically justifiable. Some other stainless reusable tenaculum usage disadvantages are as follow:

1-pain during installation 2-cervical traumatization 3-bleeding 4-probability of transmitting diseases like HBV,HCV,HIV and HPV 5-resterilization costs and 6-timeconsuming of sterilization procedures.

Whittaker et al., [6] believes that stainless tenaculum with its sharp dents can do harm to the cervical tissue and sometimes leads to bleeding. Besides it can disturb patient during application.

In a survey, Shulz et al., [7] experimented how much the cervical tissue is damaged during suction curettage abortion. They found that reusable tenaculum can cause cervical ulcers as a pathologic effect. In 2013, kucukgozgulec et al studied the pain severity caused by using tenaculum during endometrial sampling procedure. This study showed that most of the patients consider ESP (endometrial sampling procedure) as a moderate to severe painful procedure (patients mean pain 6.17 ± 2.2 according to visual pain diagram 1-10) and their pain is times by 32 when tenaculum is used [8].

Many researches show that reusable tenaculum application for cervix fixation during procedures like IUD implementation, hystrosalpingography, hysteroscopy in clinic, sonography with saline infusion etc are painful in the patients [9-13]. This pain sometimes is so severe that physician has to use regional anesthesia to relieve patient's pain. Sharp et al believe that the bleeding caused by tenaculum installation is not usually severe, but sometimes it makes the physician to stitch up the cervix tissue [14]. Furthermore, tenaculum sterilization is somehow expensive. Its expenses include [15]:

1-costs of purchasing the oven(four) 2-Fourserving ,repairing and depreciation costs 3-costs of purchasing reusable tenacula 4-energy costs like electricity,gas and water 5-costs of purchasing sterilization specified papers 6-detergent costs 6- sterilization part employees' salary.

There is a possibility that sterilization is not done properly so it can cause infection. In the recent decades, illnesses like AIDS, hepatitis and genital warts are expanded and we should attempt to provide a safe medical environment as well as removal of resistant microorganisms with the help of disinfection [16].

Nosocomial infection is one of the most important causes of mortality and imposes great financial costs both on the patient and the healthcare system. Investigations done by WHO reveals the high prevalence of nosocomial infections in the East Mediterranean countries [17]. 247 person in the USA and 4384 children in the developing countries die daily because of nosocomial infection [18]. Disease transmission routes are numerous but those transmitted by the instruments used in examination, diagnosis and treatment of patients are very common [16]. Besides sterilization process itself is harmful for the environment.

Sterilization is a time consuming process. The minimum time needed for sterilization is 30 minutes. If two or more patients come for getting service simultaneously, the physician cannot give service to all at the same time since tenacula should be sterilized after each use. Sometimes tenacula becomes contaminated and should be reesterilized which takes time and sometimes the patient has to return in another day.

2-Modified disposable tenaculum:

This kind of tenaculum is made of a biocompatible disposable material and is lighter than stainless-reusable tenaculum. It also has more flexibility. Moreover, since it does not need to be sterilized it is not time consuming and reduces the costs. The advantages of this tenaculum are as follow: 1-hence it is lighter than reusable tenaculum, it puts lower pressure on the cervix. In this way the patient feels better and has less pain and bleeding. 2-Its flexibility lets the applier to have more maneuvering ability. It can be locked in the place with the least resistance though is more easy to use 3-In addition, its flexibility does less harm to the uterine tissue and the patient feels less pain and has lower bleeding. 4-Since it is single use transmission of diseases like HIV,HPV and HCV is lower. Studies show that current sterilization process cannot remove infections completely. 5-Tenaculumsterilization cost becomes zero.6-Its disposability and flexibility elevate women' health and immunity.

RESULT AND DISCUSSION

Researches mentioned in this article, compared a stainless-reusable medical device with a disposable one. We could not find articles that specifically compare these two types of tenacula. In 1998, Kresch et al compared a kind of disposable morcellator used in supracervical laparoscopy with its stainless type. Their research showed that disposable type reduces the procedure's time and difficulty and is more economically

justifiable [19]. Disposable tenaculum is lighter as well and imposes lower pressure to the cervix tissue. In this way it facilitates the cervix fixing procedure and it is also more cost-effective.

In 1998, Turkopa et al studied the differences between the disposable balloon catheter and the metal canula used in hystrosalpingography. The benefits of using disposable device include: reduction in fluoroscopy duration, contrast agent usage reduction, having higher control over vagina and cervix during procedure that leads to have more insight to uterine cavity and bilateral tubal filling.

Disposable devices reduce patient's pain and are easier to use. If the physician needs to do selective salpingography or tubal transcervical catheterization, he can do it instantly, because unlike reusable tenacula there is no need to resterilization. Their only disadvantage is that they are expensive [20]. Modified disposable tenacula reduce patient's discomfort and pain and enable the physician to examine several patients at the same time.

In 2001, Kehen et al compared two types of canula (disposable cervical vacuum cap canula with stainless-reusable canula) in hystrosalpingography. Procedure duration in cervical vacuum cap canula was 5.3 minutes in comparison with reusable canula which was 9.3 minutes (p value < 0.001). Fluoroscopy duration time was decreased from 1.8 minutes to 0.9 minutes and radio contrast agent consumption from 15.7 ml to 4.6 ml in disposable canula application. Disposable canula reduces patient's pain (3.2 in comparison with 6.8-patient's pain was measured with visual diagram 1-10). The facility of doing the procedure by the physician with reusable canula was 3.4 vs 1.4 with disposable canula (facility was measured with visual diagram 1-10). Disposable tenaculum is as well more flexible and easier to use. In 2003, Evans et al compared Macintosh blade 3 stainless-reusable laryngoscopes with three types of disposable plastic types. They found that the pressure put by the physician was 35.5 niuton in plastic disposable laryngoscope and 30.5 niuton in reusable laryngoscopes (p value < 0.0001). Mean application time was 5.6 minutes in stainless laryngoscopes and 2.7 minutes in plastic disposable laryngoscopes (p value < 0.0001). In conclusion, plastic laryngoscopes reduce duration and difficulty of the procedure [22]. Stainless-reusable tenaculum is heavy and inflexible enough to make its application difficult in comparison with disposable type.

CONCLUSION

Considering what mentioned, authors of this article decided to design and produce modified disposable tenaculum, because it is lighter, more flexible and has unique characteristic which help us to reduce patient's pain, bleeding and traumatization. It also decreases transmission of infections like genital warts. It is more cost effective because sterilization costs are eliminated by its use.

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