

## Original articles

## The effect of male circumcision on pudendal evoked potentials and sexual satisfaction

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### Abstract

Circumcision is generally considered a simple, rapid operation with medical benefits which accrue throughout life. The influence of circumcision on sexual satisfaction has always been argued. In this study, the assessment of the pudendal evoked potentials (PEP) in adults before and at least 12 weeks after circumcision was done. Healthy males aged between 18-27 years, who were willing to undergo circumcision were included in the study. Before and after circumcision, sexual performance was evaluated with the Brief Male Sexual Function Inventory (BMSFI), consisting of sexual drive, erection, ejaculation, problem assessment, and overall satisfaction sections.

Forty-three adult males were enrolled in the study. Mean PEP latency was  $41.97 \pm 0.25$  (39.90-44.50) ms and  $44.73 \pm 0.33$  (40.90-47.60) ms before and after circumcision, respectively. Mean difference between pre- and postoperative PEP values was 2.76 ms which was statistically significant ( $p < 0.001$ ). Mean ejaculatory latency time was significantly longer after circumcision ( $p < 0.001$ ).

In the light of our findings, we conclude that circumcision may contribute to sexual satisfaction by prolonging PEP latency but further studies are warranted also regarding the other dimensions of circumcision.

**Key words :** Circumcision ; pudendal evoked potentials ; adult ; sexual satisfaction.

### Introduction

The percentage of circumcised males varies by geographic location, religious affiliation, and to some extent, by socioeconomic classification. In Western communities, it is mostly practiced for medical or cosmetic reasons. Circumcision has benefits and advantages as well as risks and disadvantages.

The influence of circumcision on sexual satisfaction has always been argued. There are conflicting reports some of which claim that penile neurophysiology and sensitivity may be changed with shortening of the penile skin, especially the mucosa (Preston, 1970 ; Master & Johnson, 1996) while others oppose (American Academy of Pediatrics, 1999 ; Learman, 1999).

It is not well determined how physiology of the praeputium and sexual satisfaction are affected in adults who were circumcised for medical reasons, i.e. phimosis or balanitis. In addition, it is hard to find adults who are willing to undergo circumcision for nonmedical reasons since part of them have already been circumcised during childhood for religious purposes. To date, there is still debate since nonstandardized patients are being evaluated with questionnaires and conclusions are obtained in accordance with the expectations.

Measurement of penile pudendal evoked potentials (PEP) to assess sexual satisfaction is an objective tool since sensory stimuli on the glans and penis are transmitted by the pudendal nerve. For this reason, we assessed the PEP (before and after surgery) in adults who have already had sexual experience and who were willing to undergo circumcision for nonmedical purposes.

### Methods and materials

Males aged between 18 and 27 years who were willing to undergo circumcision and who have had sexual experience before were included in the study. Presence of any systemic and/or neurological disease or medical indication for circumcision was taken as exclusion criteria. Informed consent was obtained from each and every patient. Gülhane School of Medicine Local Ethics Committee approved this study.

Circumcision was carried out under local anesthesia with a dorsal slit or sleeve techniques, depending on surgeon preference. Neither electrocautery nor hyperthermic devices were used during the procedure in any way.

Electrophysiological studies were carried out using MEDELEC Synergy EMG-EP device in a dark and silent neurophysiology laboratory. The stimulus was administered using penile ring electrodes at the base of the penis (cathode) and distally on the penis shaft (anode). The potentials were recorded with silver-plated superficial electrodes from Cz  $\pm$  2 cm and Fz (reference electrode)

according to the  $10 \pm 20$  system. A ground electrode was placed between the site of stimulation and the recording site (around the abdomen) in order to decrease stimulus artifacts. Stimulation threshold was the smallest intensity of current that would not cause pain in the penis, and stimulation intensity never exceeded 1.5 times this threshold. The averages of 500 responses were obtained to assess the potential and the study was repeated at least twice to verify the dependability of that value. PEP study was repeated at least 12 weeks after circumcision.

Before circumcision, their sexual performance was evaluated with the Brief Male Sexual Function Inventory (BMSFI), consisting of sexual drive, erection, ejaculation, problem assessment, and overall satisfaction sections (O'leary *et al.*, 1995). Ejaculation latency time was defined as the time between the start of vaginal intromission and the start of intravaginal ejaculation. In a 2-week period before the procedure, the subjects were asked to measure their ejaculatory latency time during at least three sessions of sexual intercourse. BMSFI evaluation and ejaculatory latency time measurements were repeated after a postoperative interval of at least 12 weeks.

BMSFI, ejaculatory latency times and PEP values were evaluated with Kolmogorov Smirnov test to find out whether they were distributed normally. Accordingly, paired-samples *t* test or Wilcoxon Signed Ranks Test was used. Data were analyzed

by using SPSS (Statistical Package for Social Sciences) for Windows 11.0. Statistical significance was set at  $p < 0.05$ .

## Results

Forty-three male patients with a mean age of 23.4 years were studied. No complications were encountered due to circumcision. Tissue healing took place within 10 days with no keloid formation.

Mean PEP latency values before and after circumcision were  $41.97 \pm 0.25$  (39.90-44.50) ms and  $44.73 \pm 0.33$  (40.90-47.60) ms respectively (Fig. 1). Mean difference in PEP latency times was 2.76 ms and it was statistically significant ( $p < 0.001$ ).

Mean subset scores of BMSFI and mean ejaculatory latency times before and after circumcision are listed in Table 1. Differences regarding BMSFI scores were statistically not significant; however mean ejaculatory latency time was significantly longer after circumcision ( $p < 0.001$ ).

PEP latency times after circumcision were longer than the preoperative values by at least 5.1% (range : 5.1-12.4%).

## Discussion

Assessment of PEP basically gives an idea about the function and completeness of peripheral and central afferent pudendal pathway and it is a

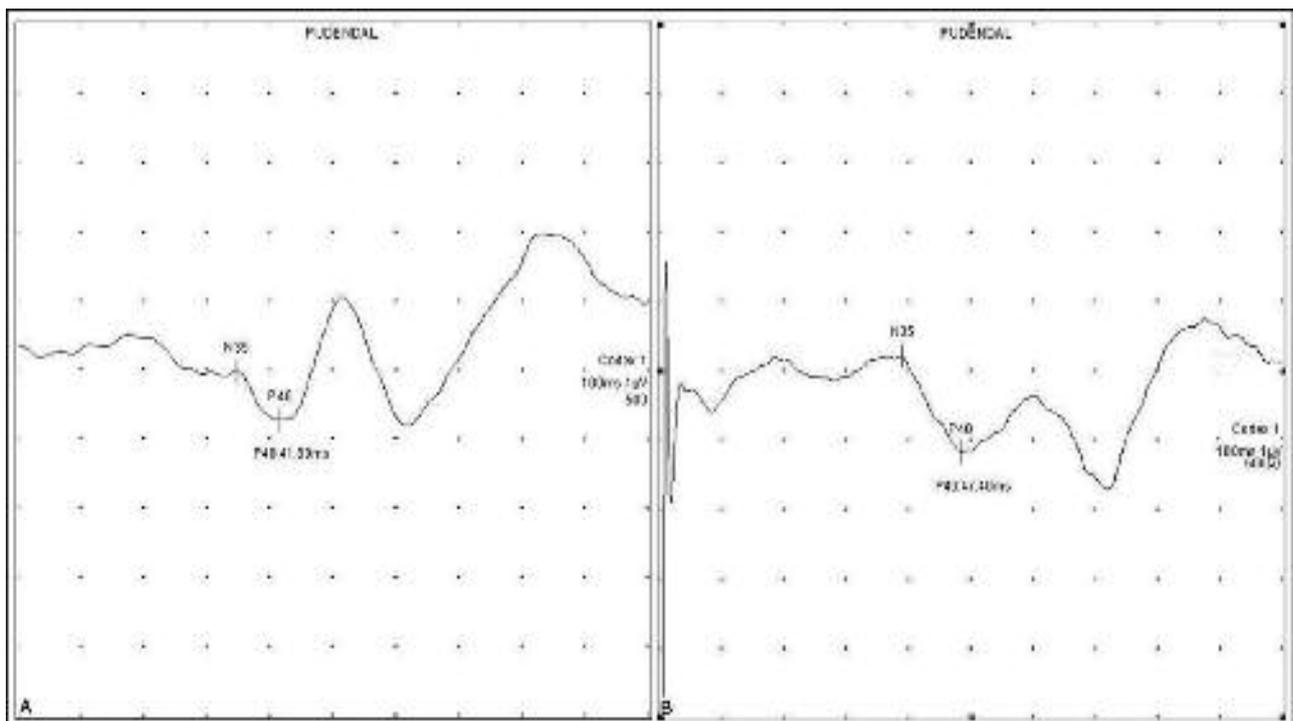


FIG. 1. — The pudendal evoked potentials (PEP) in adults before (A) and after (B) circumcision. Basic criterion in evaluation of PEPs is the P40 latency that is defined by the latency of the first significant positive deflexion after the artifact. Analysis was 100 ms.

Table 1  
Scores of BMSFI and ejaculation latency times before and after circumcision

Test	Before	After	P Value
BMSFI			
Sexual drive	6.9 ± 0.8	7.2 ± 0.9	0.11
Erection	9.9 ± 0.6	9.7 ± 0.9	0.23
Ejaculation	7.1 ± 0.6	7.0 ± 0.7	0.48
Problem assessment	10.2 ± 0.5	10.3 ± 0.6	0.40
Overall satisfaction	3.3 ± 0.7	3.6 ± 0.8	0.07
Ejaculation latency time (minutes)	3.1 ± 0.9	4.7 ± 1.1	0.001*

BMSFI : Brief Male Sexual Function Inventory.

Data presented as the mean ± SD, unless otherwise noted.

\* Statistically significant.

method to evaluate sexual stimulation. PEP is primarily important for suprasacral lesions and neurogenic/sensory potency (Yarnitsky *et al.*, 1995). Somatic sensory fibers of the penis are stimulated during PEP study. The use of specific stimulation electrodes is important as well as selection of fibers (Sarica *et al.*, 1986). On the other hand, being a difficult procedure, PEP study is not a routinely used procedure.

Latency, from the neurophysiologic viewpoint, depends mainly on distance. Spinal latency is 11 ms when pudendal nerve is stimulated because multisynaptic structures are involved. Besides, the diameter of the fibers of the pudendal nerve, receptors in the penile skin, lower level joining of pudendal fibers to medulla spinalis as compared with tibial nerve and arousal of the responses from separate areas on cortex also cause a discrepancy in latency (Report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology, 1995 ; Lundberg *et al.*, 2001).

Prolongation of intercourse time is also reported to improve sexual satisfaction. In the case of circumcision, this may be caused by decrease in the number of afferent sensory receptors due to excision of a portion of the praeputium or shortening of the mucosal tissue (Morgan, 1967 ; Taylor *et al.*, 1996) leading to an overall decrease in the sensitivity of penis. Another suggested possible mechanism for the decrease in penile sensitivity is through a desensitization process following the continuous stimulation of glans penis which becomes uncovered after the circumcision (Taylor *et al.*, 1996). Decrease in the intensity and duration of stimulation leads to an increase in the duration of intercourse which in turn results in an improved sexual satisfaction. Senkul *et al.* reported in a previous study that circumcision improves sexual satisfaction thereby prolonging ejaculation latency (Senkul *et al.*, 2004). The current study provides objective data supporting this suggestion. Furthermore, PEP latency is prolonged by at least 5% after circumcision. This may indeed be related to ejaculation latency. However, PEP latency is influenced by many factors and more research is needed to find

out whether these factors have an impact on the results.

Very few studies exist in the literature advocating that erectile function benefits from circumcision. Fink *et al.* reported that erectile function may even be worsened after circumcision in patients with cardiovascular disease, depression and diabetes. Moreover, circumcision may cause psychological trauma in some patients which in turn may result in erectile dysfunction and thus decreased sexual satisfaction (Fink *et al.*, 2003). However, our study showed that erectile function is not affected by circumcision. Further, in other cohorts where circumcision is perceived differently due not only to medical reasons but also to social and religious perspectives, overall results may be different.

To our knowledge, this is the first study assessing the PEP latency before and after circumcision. According to our data, after circumcision, PEP latency is prolonged significantly and sexual function is not adversely affected. The increase in the ejaculatory latency time can be considered an advantage rather than a complication. Consequently, we believe that circumcision may improve sexual satisfaction by increasing intercourse time but further studies with respect to several other dimensions of circumcision are also needed.

## REFERENCES

- AMERICAN ACADEMY OF PEDIATRICS. Circumcision policy statement. Task Force on Circumcision. *Pediatrics*, 1999, **103** (3) : 686-93.
- FINK K. S., CARSON C. C., DE WELLIS R. F. Adult circumcision outcomes study : effect on erectile function, penile sensitivity, sexual activity and satisfaction. *J. Urol.*, 2003, **167** : 2113-6.
- LEARMAN L. A. Neonatal circumcision : a dispassionate analysis. *Clin. Obstet. Gynecol.*, 1999, **42** : 849.
- LUNDBERG P. O., ERTEKIN C., GHEZZI A., SWASH M., VODUSEK D. European Federation of Neurological Societies Task Force on Neurosexology. *Euro. J. Neurology*, 2001, **8** (s3) : 2-24.
- MASTER W. H., JOHNSON V. E. Human sexual response. Boston : Little, Brown & Co, 1996, 189-190.

- MORGAN W. K. Penil plunder. *Med. J. Aust.*, 1967, **1** (21) : 1102-3.
- O'LEARY M. P., FOWLER F. J., LENDERKING W. R., BARBER B., SAGNIER P. P., GUESS H. A., BARRY M. J. A brief male sexual function inventory for urology. *Urology*, 1995 Nov, **46** (5) : 697-706.
- PRESTON E. N. Whither the foreskin ? A consider of routine neonatal circumcision. *JAMA*, 1970, **213** : 1853-8.
- REPORT OF THE THERAPEUTICS AND TECHNOLOGY ASSESSMENT SUBCOMMITTEE OF THE AMERICAN ACADEMY OF NEUROLOGY. Assessment : neurological evaluation of male sexual dysfunction. *Neurology*, 1995, **45** (12) : 2287-92.
- SARICA Y., KARACAN I., THORNBYS J. I., HIRSCOWITS M. Cerebral responses evoked by stimulation of vesico-urethral junction. *Electroencephalogr. Clin. Neurophysiol.*, 1986, **65** (6) : 440-6.
- SENKUL T., ISERI C., SEN B., KARADEMIR K., SARACOGLU F., ERDEN D. Circumcision in adults : on sexual function. *Urology*, 2004, **63** (1) : 115-8.
- TAYLOR J. R., LOCWOOD A. P., TAYLOR A. J. The prepuce specialized mucosa of penis and its loss to circumcision. *Br. J. Urol.*, 1996, **77** : 291-5.
- YARNITSKY D., SPRECHER E., BARILAN Y., VARDI Y. Corpus cavernosum electromyogram : spontaneous and evoked electrical activities. *J. Urol.*, 1995, **153** (3) : 653-4.

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