

*Case report* ■

# Reparation of Traumatic Injury of Anal Sphincter: Case Report and Review of Surgical Treatment

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## SUMMARY

Anal sphincter injuries are rare and usually related to obstetric injuries. Other more frequent causes of a violent injury of the anal muscles (including the rectum) are war injuries, violent civil injuries, iatrogenic injuries during surgeries, sexual injuries and accidental injuries. Accidental injuries are extremely rare and, searching Medline, Scopus and Medscape for the past five years, I have found only a few descriptions of such injuries. Almost all such articles are of “the case study type”.

This paper presents two cases of accidental anal muscle injuries which were successfully operated by using the reconstructive surgery procedure. One case is about fecal incontinence due to a major muscle injury, and the other is about a partial injury of the external anal muscle in two places. The diagnoses were made by palpation and operative exploration. The anal manometry, electromyography and transanalsonography were not used.

By presenting two accidental anal sphincter injuries and by reviewing the data from the published works, the aim of the paper was to help us determine when and how to operate and whether an additional diagnosis is always necessary. This article focuses on rare and specific but frequently very serious injuries. The reparation by primary sphincteroplasty gives excellent results.

**Key words:** trauma, accidental anal injuries, fecal incontinence

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**INTRODUCTION**

The anal sphincter is a very complex sensory and muscular mechanism and its injury is rarely life-threatening, but it almost always leads to a heavy disruption of the quality of life. Anal sphincter injuries can be classified as: violent injuries at peace-time (1), war injuries (e.g. by bullets, shrapnels, etc.), sexual injuries (both auto and hetero injuries) (2), childbirth injuries (most common), accidental injuries and iatrogenic injuries during surgery. Injuries by heat or by chemical substances are extremely rare.

No matter how an injury was sustained, the following should be determined: 1. whether there are associated injuries in other systems, 2. whether an injury is isolated in the region of the anus, 3. whether an injury includes the rectum, too (extra-peritoneally), with or without a perforation, and 4. whether there are signs of a peritoneal perforation and an infection (3).

If an injury is isolated on the anal sphincter, we grade the fecal incontinence severity index (FISI) (4, 5).

Every serious sphincter injury also requires the grading of the quality of life sooner or later after the injury (FIQL) (6). That is why the reparation of an anal sphincter injury and the resulting fecal incontinence (if present) is essential for the injured patient and his/her family, as well as for the wider community because the physical and psychological recovery affects the working ability and the economic cost of the care. Unfortunately, the result of such injury is sometimes a reduced working ability, for example, with a permanent stoma.

The anal sphincter is anatomically well protected by the fat tissue in the ischio-rectal area, and by the gluteal muscles and pelvic structures (7). This is why these injuries are not frequent and they are mostly caused iatrogenically, for example, by surgery or at childbirth (8). The other less common causes of the abnormal sphincter function are listed in Table 1 (9), no matter whether their cause is an injury or not.

**Table 1.** Causes of fecal incontinence depending on the state of the sphincter

<b>Incontinence with a normal sphincter:</b>	<b>Incontinence with an abnormal sphincter:</b>
<ul style="list-style-type: none"> <li>• Severe diarrhea</li> <li>• Fecal impaction</li> <li>• Low rectal stretch</li> <li>• Inflammatory bowel diseases</li> <li>• Rectal tumors</li> <li>• External compression</li> <li>• Fistula</li> <li>• Dementia</li> </ul>	<ul style="list-style-type: none"> <li>• Direct sphincter injury</li> <li>• Surgical</li> <li>• Traumatic</li> <li>• Neuropathy of the sphincter</li> <li>• Lesion of the upper motor neuron</li> <li>• Cerebral (tumor, stroke, injury)</li> <li>• Spinal (demyelination, tumor)</li> <li>• Lesion of the lower motor neuron</li> <li>• Caudaequina</li> <li>• Diabetes</li> <li>• Pelvic tumor</li> <li>• Demyelination</li> <li>• Congenital anomalies</li> <li>• Rectal prolapse</li> </ul>

The total percentage of incontinence among the general population is about 2%, but it significantly increases in patients over the age of 50 and goes up to 11% in men and 26% in women (10). There are idiopathic incontinenes, too. However, the presentation of the following two cases is not given to discuss incontinence, but to provide information how to proceed in cases of accidental injuries only, although there is a high degree of correlation.

## CASE REPORTS

In 2012, we operated on two men with traumatic injuries of the anal sphincter.

### Case report No1

A young man was injured in an accidental fall on a tool with iron spikes. The injury caused bleeding from the wound and an inability to contract the anus completely. A rectal touch determined the existence of a slight grip which was always followed by pain. The anal manometry, electromyography and transanal ultrasound were not used. By inspection, we immediately noticed two punctual injuries on the border between the skin and mucous membrane of the sphincter at 11 h and 7 h in the gynecological position. The injuries were slightly bleeding at the time of examination. We also noticed that parts of the muscle fibers were missing, but no major edema or destruction was present.



**Figure 1.** Injury



**Figure 2.** Drainage and closed injury

During the operation, after a circular expansion of the damaged skin, we observed the above-mentioned anal muscle defects without a continuity interruption of the entire layer of the external anal sphincter. Actually, the muscle was stratified and without a significant portion of the middle part of the muscle (Figure 1). It was qualified as a partial anal muscle injury. The surrounding adipose tissue was damaged more deeply without any evident damage to vital structures. The smeared wound edges being excised, we approached the external anal sphincter (EAS) with torn muscle fibers. Using a figure-of-eight suture, we reconstructed EAS and sutured the mucosa transition after draining a deeper ischio-rectal space positioned at 11 h (Figure 2). A protective stoma was not made.

The postoperative result was good as well as the control check one month after the surgery.

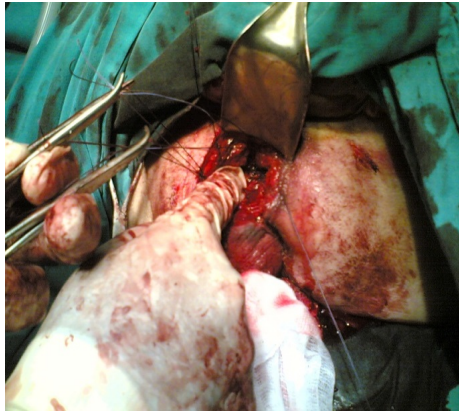
### Case report No2

A man in his sixties was admitted with an accidental injury of the entire perineum and anus. The injury in the perineum went deep into tissues with a cleft of the perineal body and bulbo-spongiosus muscle, and it continued downwards opening the external anal sphincter. The internal anal sphincter (IAS) was intact. The patient could not contract the anus. By palpation, it was determined that there was no tonus on a grip (Figure 3).

We performed the surgery after placing a urinary catheter, giving general anaesthesia. The injury of the urethra was excluded (the appearance of urine, absence of blood and no outside extravasation after a transurethral wash-out). Again, the anal manometry, electromyography and transanal ultrasound were not used. The muscles were recognizable, though contused. After their partial preparation, they were slip-knotted and additionally prepared. First, the EAS was reconstructed by means of the overlap technique about 1 cm in length. Next, we reconstructed the proximal and deeper muscles belonging to the frontal part of the anal levator-muscle and, then, the bulbo-spongiosus muscle of the perineum by an apposition and without duplicatures or complications.

The skin was sutured with rare stitches and a protective lateral stoma on the "rider" was made, with washing-out through the distal part of the stoma (Figure 5).

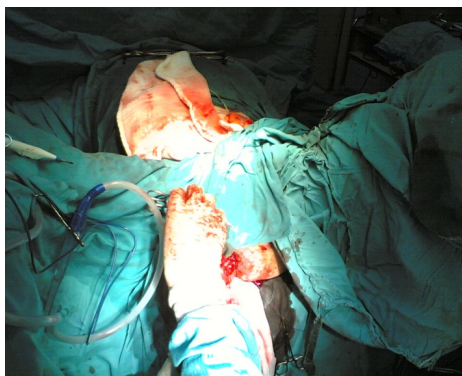
The patient successfully recovered and was discharged in 8 days' time. Fifteen days later he had a strong grip of the anus and no wound infections or other complications. He refused a control manometry in a tertiary institution.



**Figure 3.** Injury of the deep perineum



**Figure 4.** Injury of the EAS and perineal muscles



**Figure 5.** Derived protective stoma

## DISCUSSION

The treatment of an anal sphincter injury can be either conservative or surgical, urgent or postponed, with or without stoma. When, where and how to approach the treatment of anal traumatic injuries, particularly the accidental ones, are the questions which were logically raised and which motivated us to present these two cases.

An injury causes an anal sphincter dysfunction and, very rarely, a dysfunction of neurothropic nerves (n. pudendalis) or a resulting neuropathy-induced dysfunction. The grading of an injury is usually done in cases of

childbirth injuries or when, after a certain time, we determine that the results of the treatment have not been satisfactory in terms of continence. The classification of obstetric injuries cannot be applied to accidental injuries (11). In an emergency with an accidental (mechanical) injury, it is needless to do the endoanal ultrasound, anal manometry or electromyography because an infection may be transmitted when placing instruments and we would not get the information which could help us in an operative rehabilitation of the injury. If we give up the primary reparation due to severe devastation of the region, these methods will provide valuable data later. The anal manometry done postoperatively can too objectify the quality of the performed surgery. Any additional procedures are also hindered by the poor technical competence of both the clinical center and district centers in southeastern Serbia.

When talking about the accidental (acute) injuries, we can say that either partial or complete muscle injuries can be with or without a defect. It is always essential to determine immediately if there is an incontinence of some degree. It is best to reconstruct partial injuries without any delay and without stoma. The ISA injuries can be sewn if the distance (the defect) between the parts is not long. If symptoms are scarce and the injury does not cause any serious problems, it is better to leave the sphincter intact. The IAS is responsible for less than 70% of the sphincter tonus at rest (12) and for the so-called passive incontinence which rarely has socially unacceptable symptoms. Otherwise, there is no direct correlation between the scoring systems for injury severity and symptoms of fecal incontinence (13).

Not all injuries produce incontinence, but it should be graded as soon as possible. There are several scales of incontinence. In the USA they use the Cleveland Clinic Florida Score (Wexner's score) of fecal incontinence (i.e. fecal incontinence score or FIS) because of its simplicity: each degree of incontinence (from the disruption of the lifestyle and occasional smearing of the underwear to uncontrolled release of gas and liquid stool and, finally, the loss of control over solid stool) is divided into five parametres depending on their frequency (never, rarely, occasionally, usually and always). Thus they differ 20 degrees of incontinence. Furthermore, the loss of control is defined by a time factor, too (e.g. uncontrolled stool three times a week) (14). In fact, the Browning-Parks scoring system is much simpler. According to it, incontinence has four degrees: a complete control, the loss of control over gases, over liquid stool and over solid stool (15). So far, many other scales have been published: Pescatori's scale of FIS, then, Miller's, Williams's, Vaizey's and St Marc hospital scores (16). As far as the quality of life (FIQL) is concerned, there are Rockwood's score and German, French and Japanese modifications (17) of incontinent patient testing.

Whether to make a stoma or not should be decided soon after an injury occurs. It is acceptable to make a diversion when the primary sphincter reparation is gi-

ven up because of a severe destruction of the anal sphincter and, possibly, of the surrounding tissues with unrecognizable anatomic structures (18). In that case, the reparation is performed as a *postponed or secondary* one when the edema decreases and when the differentiation between vital and ischemic, dysfunctional tissues is established. If the delay is too long, scar-changed parts of the muscle appear in the fibrous tissues.

Further diagnostic procedures are indicated as follows: the anal manometry both before and after the surgery, then, electromyography, transanal ultrasound and optional MRI, as well as defectography and measurement of the pudendal nerve impulse delay. The additional diagnostic procedures prevent mistakes in estimating the severity and extent of an injury since it has been registered that in approximately 40% of the cases there is a residual part of an injury after the reparation.

We took no additional diagnostic measures because we thought that they were not necessary in the specific cases - the local conditions for the primary reparation were satisfactory. We believe that obvious and localized injuries do not require any additional diagnostic procedures except as an academic upgrading of diagnostics. Some published works relativize the absolute value of the anal manometry and endosonography as safe indicators of the defect level and reparation effectiveness. They deny the correlation between test results and subjective symptoms (19).

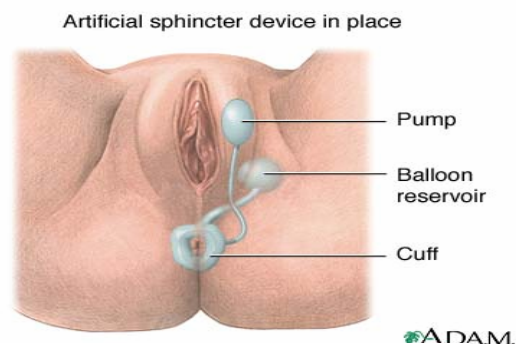
The best results are obtained by the frontal sphincteroplasty, particularly the method of muscle overlapping (20, 21). Much poorer results are produced by the lateral and posterior sphincteroplasty. In cases of accidental injuries we cannot choose the place of the suture. The frontal and rear levatoroplasty can be performed as an additional procedure in order to strengthen the sphincter tonus. In that way the anus canal is "extended" and the maximal grip zone is reinforced. We used the figure-of-eight suture in connecting the ends of the severed muscles, which is recommended by many as a somewhat simpler solution (22-24). A seriously damaged sphincter which is impossible to repair has an alternative in a permanent colostomy or in an effort to create a neo-sphincter by using the gluteal muscle, electrically stimulated m. gracilis or an artificial anus (Figure 6) (25).

In case of an IAS injury, substances which increase the tonus of the muscle and of the entire sphincter complex can be either spread or injected (i.e. Catopil) (26, 27).

## CONCLUSION

The reparation of the isolated accidental anus injuries should not be urged. After administration of analgesics and antibiotics and after the wound has been cleaned, we should first exclude possible injuries of the urethra and surrounding organs (septum, vagina or scrotum), determine the degree of the rectal injury if any, and eventually examine the intra-abdominal symptoms if they develop as a consequence of a perforation in the peritoneum around the upper rectum. The next step is to classify the degree of incontinence. In accidental injuries, the degree of the sphincter damage is almost always so visible that additional procedures for determining the exact place of the injury or the grip degree are not needed in most of the cases. As far as larger and more serious injuries are concerned, it is desirable to sew the skin *in situ* after the bleeding has been stopped, and let the edema and hematoma withdraw and certain tissues devitalize. However, it is not necessary to do it straightaway, especially if there is a specialized team.

On the other hand, the tissues can be immediately reconstructed layer by layer - unless they are largely devitalized. The more recent works listed below neither give priority to the urgent repair technique nor exclude it. Principally, the intervention should not be delayed. Similarly, the muscle overlapping surgical technique has no proven advantages in relation to the apposition. The fact is that as the time passes and the patient grows older, the sphincter grip may become weaker and some unsatisfactory results may appear (28).



**Figure 6.** Artificial sphincter  
(Internet, access without limits)

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## REPARACIJE ZADESNE POVREDE ANALNOG SFINKTERA: PRIKAZ SLUČAJA I OSVRT NA HIRURŠKI TRETMAN

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### Sažetak

Povrede analnog sfinktera su retke i uglavnom se odnose na porođajnu povredu. Drugi češći razlozi nasilnog povređivanja analnog mišića (pa i rektuma) su: ratne povrede, nasilne civilne povrede, jatrogene povrede pri operacijama, seksualne povrede, zadesne povrede. Zadesne povrede su izuzetno retke. Pretraživanjem Medlinea, Medscapea i Scopusa u zadnjih pet godina je nađeno svega nekoliko radova sa opisom ovih povreda. Gotovo svi radovi su tipa „prikaz slučaja“.

U radu prikazujemo dva slučaja zadesnih povreda analnog mišića koji su uspešno operisani rekonstruktivnom procedurom. U jednom slučaju bila je prisutna fekalna inkontinencija zbog kompletne povrede mišića, a u drugom slučaju parcijalna povreda spoljašnjeg analnog mišića na dva mesta. Dijagnoza je postavljena palpacijom i operativnom eksploracijom. Analna manometrija, elektromiografija i transanalna ehsonografija nisu rađene.

Cilj rada bio je da prikazemo dve zadesne povrede analnog sfinktera, te da uz pregled literaturnih podataka pokušamo da odredimo kad i kako operisati; da li je uvek neophodna dodatna dijagnostika.

Radi se o retkim ali specifičnim, ne retko i teškim povredama. Reparisanje sfinkteroplastikom daje odlične primarne rezultate.

**Ključne reči:** trauma, incidentalna analna povreda, fekalna inkontinencija