Original Article

Fecal incontinence as consequence of anorectal surgeries and the physiotherapeutic approach

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ABSTRACT: Caused by sphincter injuries in various anorectal procedures, fecal incontinence (FI) is a common complication in some patients undergoing coloproctology surgeries. Objective: Demonstrate the occurrence of FI as a result of anorectal surgeries, present the physiotherapy resources for the treatment of this disorder and, based on that, propose the inclusion of physiotherapy as a routine postoperative practice for these types of interventions. Materials and Methods: An integrative review of databases from the virtual health library (VHL) and the Physiotherapy Evidence Database (PEDro) published between 2000 and 2010, in English and Portuguese. Results: Thirteen articles (one cross-section cohort, two uncontrolled clinical trials and ten retrospective cohorts), with evidence level between 2C and 4C and published between 2001 and 2009, were selected; review articles were excluded. The review demonstrated that FI is an important complication of anorectal surgeries, causing major impacts on the patients' quality of life and that physiotherapy provides effective resources to treat this disorder. Conclusion: Further studies are recommended, in the form of systematic reviews, using a higher number of articles and better scientific evidences.

Keywords: colorectal surgery; postoperative complications; fecal incontinence; physiotherapy; prevention.

INTRODUCTION

It is estimated that around 5% of the adult population of the United States have anal disorders; in Brazil, they are more predominant in women between 30 and 50 years old[1]. In coloproctology routine, these disorders account for around 50 to 80% of total surgeries in this department[1-3]; and the most common operations are for hemorrhoid and anal fissure and fistula treatments, which can adopt conservative methods; however, the surgery is sometimes required[4].

The postoperative phase of most interventions usually involves intense discomfort, pain, secretion, bleeding, among other typical symptoms, and it is extremely important for a successful treatment[4]. The fear of postoperative pain is the patients' main reason to run away from the proctology surgery, postponing a procedure whose indication is almost always precise[5]. However, traditional surgical treatments may often promote fecal incontinence (FI), caused by sphincter injuries, constituting a complication in some patients[4] that can become a permanent disorder[6].

FI is the inability to keep the physiological control of the bowels in a socially adequate place and time, with symptoms varying from occasional flatus to continuous and involuntary stool loss[7,8], and the patients with fecal incontinence are more subject to health complications, such as skin injuries, urinary in-

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fection and nutritional alterations[9]. The losses develop high physical and psychological inability, leading to reduced self-esteem and gradual social withdrawal, with negative impact on the patients' mental health and psychosocial aspects[10].

In hemorrhoidectomy and anal fissurectomy with internal sphincterotomy, the occurrence of FI can be considered a serious technical error. In anal fistulotomy, with internal or external sphincter incision, it may be an expected consequence; however, it should be prevented by the medical team[4]. The clinical selection of FI treatment method is dependent on the disorder etiology, and the options include dietary changes and medicine that reduces the intestinal motility[11].

The physiotherapy approach of perineal re-education is another conservative therapy that involves training for increased contractile ability and voluntary control of the external anal sphincter and the levator ani muscle, as well as analgesia, by incrementing the local blood circulation[12]. In a debate published by *Revista Brasileira de Coloproctologia* in 1999, five coloproctologists discussed about the ideal composition of a multidisciplinary team in this area, and only one of them had a physiotherapist in his team[13].

In view of that, the purpose of this study was to demonstrate the occurrence of FI as a consequence of anorectal surgeries, present the physiotherapy resources and their efficacy in the treatment of this disorder and, based on that, propose the inclusion of physiotherapy as a routine postoperative practice for these types of interventions to prevent FI and other complications.

MATERIALS AND METHOD

An integrative review was conducted in databases from the virtual health library (VHL) and the Physiotherapy Evidence Database (PEDro), using the following indicators: *Fecal Incontinence*, *Postoperative Complications*, *Colorectal Surgery*, *Prevention* and *Physiotherapy*, all obtained from DeCS/MeSH descriptors.

The inclusion criteria were: studies that addressed fecal incontinence as a consequence of anorectal surgeries and that had been published between 2000 and 2010. Table 1 shows references of all articles. Databases were also screened for therapy methods used by physiotherapy to treat FI. Review articles were excluded.

Thirteen articles were selected (one cross-section cohort, one study of a series of cases, two uncontrolled clinical trials and nine retrospective cohorts), with evidence level between 2C and 4C, three of them related to the treatment of anal fistula, six to anal fissure and five to hemorrhoid, all published between 2001 and 2009; one of the articles, with two types of orifice pathology, appears twice in this study – and in Table 1 –, and for this reason, this investigation analyzed 13, and not 14 articles. The evidence levels from the analyzed studies were classified according to the Oxford Centre for Evidence-based Medicine[14].

Theoretical reference

The anal continence mechanism is complex and involves the integrated action of anal sphincter muscles and pelvic floor muscles, the presence of rectoanal inhibitory reflex, the rectal capacity, sensitivity and complacency, as well as the stool consistency[15].

The internal anal sphincter (IAS) is a smooth muscle in continuous condition of maximum contraction, creating a natural barrier to prevent stool loss[16] and representing 55% of the pressure of the anal canal at rest[17]. The external anal sphincter (EAS) is a striated muscle and its deeper portion is close to the puborectalis muscle and it seems to be a single assembly, despite their distinct innervation[16]. It promotes 30% of the anal canal basal pressure and, with the puborectalis muscle, it produces the voluntary contraction pressure of the canal[17]. The EAS, the puborectalis muscle and the levator ani muscles are predominantly composed of type I fibers, characteristic of skeletal muscles with tone contractile activity[18].

When in liquid state, feces quickly reach the rectum, causing sphincter muscle overburden and, even in normal individuals, they may lead to urgent episodes and fecal incontinence[16]. The rectoanal inhibitory reflex enables the stool to be eliminated to be in contact with the proximal portion of the anal canal, a region with many free nervous terminations, and this way, it is felt by the individual[19]. The rectal capacity and complacency allow the defecation to be postponed, and the sensitivity accounts for rectal completeness[16]. Lastly, the hemorrhoid plexuses promote the remaining 15% of the pressure at rest for the anal canal closing[17].

Dilation resulting from the insertion of a speculum to expose the anal canal, which is involved in most anorectal surgical procedures, may affect continence, due to sphincter injuries, mostly temporary[20]. Speakman et al.[21] reported fecal incontinence in 12 men after dilation, observed through anal manometry and ultrasound; all of them presented low pressure of the anal canal at rest and 11 had IAS injury, which significantly impacted continence. The same study also identified EAS injury in three of these patients.

Fecal incontinence as a consequence of anorectal surgeries: literature review

Surgical correction of anal fistula: Fistulectomy/ Fistulotomy

Anal fistula is granulation tissue connections between the anorectum and the perineum that are more predominant in men. They are mostly caused by idiopathic reasons and originate from the anal glands, but they may result from other causes, such as perianal alterations and injuries[22]. Anal fistula healing prevents

Table 1. *References of articles included in the study.*

Author	Year	Study design/ Evidence level	Pathology	n	Surgical intervention	Incontinent patients (%)
Prudente et al.[1]	2009	Retrospective cohort/4C	Anal fistula	58 (455)	Fistulectomy	36.0 (flatus) 10.0 (feces)
Pescatori et al.[28]	2003	Retrospective cohort/4C	Anal fistula	39	Fistulectomy	24.0 (feces)
Garcia-Armengol et al.[29]	2001	Uncontrolled clinical trial/4C	Anal fistula	31	Sphincteroplasty after fistulectomy	20.0 (soiling) 4.0 (flatus)
Prudente et al.[1]	2009	Retrospective cohort/4C	Anal fissure	59 (455)	Fissurectomy with LLS*	3.5 (flatus)
Hasse et al.[37]	2004	Retrospective cohort/4C	Anal fissure	209	Sphincterotomy	14.8 (feces)
Patti et al.[38]	2009	Uncontrolled clinical trial/4C	Anal fissure	16	Advancement flap	25.0 (feces)
Arroyo et al.[39]	2001	Retrospective cohort/4C	Anal fissure	254	Internal lateral sphincterotomy	4.7 (feces)
Baldez[40]	2004	Cross-section cohort/2C	Anal fissure	120	Sphincterotomy/ hemorrhoidectomy	30 (feces)
Cassillas et al.[42]	2005	Retrospective cohort/4C	Anal fissure	184 (298)	Sphincterotomy	31 (flatus) 30 (feces)
Souza et al.[48]	2003	Retrospective cohort/4C	Hemorrhoidal disease	247 (580)	Hemorrhoidectomy - Milligan-Morgan's technique	3.9 (feces)
Altomare et al.[49]	2001	Uncontrolled clinical trial/4C	Hemorrhoidal disease	20	Stapled hemorrhoidectomy	35 (feces)
Cruz et al.[46]	2007	Retrospective cohort/4C	Hemorrhoidal disease	2417	hemorrhoidectomy	0.2 (feces)
Marianelli et al.[50]	2008	Retrospective cohort/4C	Hemorrhoidal disease	212	Conventional hemorrhoidectomy	0.5 (feces)
Sobrado et al.[51]	2006	Retrospective cohort/4C	Hemorrhoidal disease	41	Procedure for Prolapse and Hemorrhoids (PPH)	2.4 (feces)
				155	Hemorrhoideopexy using circular stapler	1.9 (flatus)

**Left Lateral Sphincterotomy*

recurrent septic processes that may lead to new anal sphincter injuries, which is a potentially threatening fact. Then, fistulas are a clear indication of surgical intervention[20]. Some authors suggest that alterations to continence in these procedures are due to anal deformation caused by healing and/or intraoperative sphincter injury[23].

The incidence of incontinence after fistulotomy ranges from 18 to 52%, with soiling in up to 35-45% of the patients[24-27]. In the retrospective study conducted by Prudente et al.[1], all surgeries made by the Service of Coloproctology of a university hospital in Sergipe between 2005 and 2007 were analyzed, totaling 455 procedures. Fistulectomy was performed in 20% of the cases, and fecal incontinence after the surgery was observed in 36% of the patients.

Among the 39 patients submitted to fistulectomy observed in the retrospective study conducted by Pescatori et al.[28], nine (24%) complained of fecal incontinence. Garcia-Armengol et al.[29], when analyzing the result of an immediate reconstruction of anal sphincter of a selected group of patients at risk of FI after fistulectomy, observed that, after the follow-up period, among the 25 continent patients before the surgery, five (20%) presented perianal soiling and one (4%) presented flatus incontinence.

Surgical correction of anal fissure: Fissurectomy/Sphincterotomy

Anal fissure is a linear injury in the anal canal skin, generally a single lesion, located in the posterior portion of the anus, usually resulting from the passing of hard stools. It produces spasming of the internal anal sphincter, which will make the injury remain, due to pain and difficult evacuation. It may heal naturally or require a surgical procedure[30].

A partial or full incision in the internal anal sphincter, made during sphincterotomy, is the most effective method to reduce the anal pressure of the anal canal at rest in individuals with anal fissure[31]. The risk of FI is higher in patients with more chances of presenting signs of fecal loss, just as elderly people, women (particularly multipara), individuals with prior anoperineal surgery, anal Crohn's disease, chronic diarrhea or previous complaints of incontinence[32,33]. In these cases, the advancement V-Y flap is recommended, in which the granulation tissue with reduced blood flow around the fissure is covered by a healthy and well vascularized flap[34]. The reduced pressure at rest of the anal canal after the surgery may be the cause of FI[35].

Lateral sphincterotomy is the most common technique for the surgical treatment of anal fissure[36]. In the study conducted by Prudente et al.[1] mentioned above, the technique used by the hospital service was fissurectomy with left lateral sphincterotomy, presenting, as postoperative complications, pain in 62.5% and flatus incontinence in 3.5% of the cases. Hasse et al.[37] analyzed long-term results after lateral sphincterotomy in 209 patients, and, despite the increase in the healing rate of fissures to 94.7%, they observed 14.8% of fecal incontinence three months after the surgery.

Patti et al.[38] reported in their study that, among the 16 individuals submitted to advancement flap for chronic anal fissure correction, 4 (25%) remained with fecal losses. Arroyo et al.[39] reported 5.5% of incontinence from total 254 patients submitted to internal lateral sphincterotomy six weeks after the surgery. Baldez 2004[40] observed that 30% of the 120 patients with fecal incontinence analyzed in the study had sphincter injuries caused by complications of inadequate anorectal surgeries and Leite et al.[41] reported in their study two individuals with FI resulting from surgical injuries among total 16 individuals.

In the study conducted by Casillas et al.[42], long-term results of patients submitted to sphincterotomy for chronic anal fissure correction were evaluated. The medical records were analyzed and a questionnaire to assess the patients' current state was sent to them, as well as a questionnaire about the quality of life with FI and an investigation to quantify the severity of losses. From total 298 patients, 62% returned the questionnaires. Temporary incontinence occurred in 31% of the patients and persistent flatus incontinence occurred in 30% of the cases.

Surgeries for hemorrhoidal disease: hemorrhoidectomy

The surgical treatment of hemorrhoidal disease should be selected to patients with persistent symptoms after a clinical or conservative treatment[43]. Continence disorders reported after hemorrhoidectomy range between 0 and 28%[44,45]. The fact of having the anal canal partially filled with hemorrhoid cushions,

whose removal may lead to widening, according to the cushion size, may cause incontinence, but, after a while, when the sphincter contraction returns to normal, fecal and/or flatus incontinence may reduce[46].

Moreira Jr. et al.[47], in a study comparing hemorrhoidectomy with and without sphincterotomy in the treatment of end-stage hemorrhoidal disease, showed that such association did not reduce the postoperative pain and it increased the risk of anal incontinence. In a hospital in the State of Bahia, 580 anorectal surgeries were performed in 5 years; 42.6% of them were hemorrhoidectomy procedures, and all cases of temporary fecal incontinence (3.9%) were submitted to the Milligan-Morgan technique[48].

Altomare et al.[49], when analyzing the long-term effects of hemorrhoidectomy, reported that all patients (n=20) submitted to stapled hemorrhoidectomy had incontinence before the surgery and, in the postoperative period, seven patients (35%) still experienced some fecal incontinence, especially urgent episodes.

Alterations to the anal canal sensitivity and postoperative complications, such as stenosis and anal incontinence, are due to muscle fiber injury, which may occur during the surgical procedure[49]. Some studies that also report FI after hemorrhoidectomy are: Cruz et al.[46], who obtained 0.2% of fecal incontinence, Marianelli et al.[50], with 0.5% of patients reporting fecal losses after the conventional hemorrhoidectomy technique and 2.4% after mechanical hemorrhoidopexy and Sobrado et al.[51], with 1.9% of incontinence cases after the surgery.

DISCUSSION

The analysis of selected studies showed that the surgery for anal fistula correction is the one presenting the highest risk for anal continence, an evidence confirmed by Sainio[52] and Ommer et al.[20], who reported in their studies that this procedure is one of the main causes of continence disorders.

Although the articles analyzed presented different numbers of studied individuals, they demonstrated that surgeries for anal fissure correction are the second intervention that most affect continence. Lateral sphincterotomy, in most cases, leads to quick healing of chronic fissure and presents low recurrence rate, but it may be associated with long-term anal incontinence[37].

Late complications of hemorrhoidectomy include: urinary tract infection, secondary bleeding, injury infection, anal fissure and anal incontinence. Up to 50% of the patients complain of soiling in early postoperative period[53,54]. In their study, Altomare et al.[49] observed that, six months after hemorrhoidectomy, anal continence was reestablished in all analyzed cases.

Non-surgical treatments of FI, especially effective in symptomatic cases and in patients with accelerated colonic transit, appear to be very useful during the postoperative period of anorectal surgeries, as they help improve and keep the results obtained with the surgery and prevent postoperative complications. Physiotherapy can act on anorectal disorders and offers resources that will attempt to promote the evacuation control[55].

The basic objectives of perineal re-education can be considered as: prevention and treatment of pelvic floor dysfunctions and it actually constitutes the gold standard for the treatment of such disorders, as they increase tone and strain of pelvic floor fibers in the presence of variations in intra-abdominal pressure[6,56].

The progress of physiotherapeutic techniques has enabled the functional recovery of the pelvic floor and it may restore the anal continence functionality, thus improving the quality of life of individuals with FI[6]. The physiotherapeutic techniques for perineal re-education include: perineal electrostimulation, biofeedback and perineal kinesiotherapy.

The purpose of electrostimulation is to improve the power, speed and resistance of the voluntary contraction of the external sphincter or improve the perception of the external sphincter and, consequently, the ability to control or postpone evacuation in response to the evacuation desire[57].

The muscle function can be improved by changing faster-contracting, fatigable muscle fibers into slower-contracting less fatigable fibers and by increasing the capillary density in the region, promoting the efficient activity of these slow and oxidative fibers. This is a low-cost technique, usually well tolerated, with most patients that are submitted to it reporting benefits with the treatment[58-60].

According to a prospective study conducted by Pescatori et al.[61], an improvement in clinical, psychological and manometric aspects was observed in two thirds of the investigated patients with fecal inconti-

nence who received anorectal electrostimulation for 30 days, once a day.

Biofeedback is a clinical treatment frequently indicated to fecal inconsistence in the colorectum and gastroenterology literature[58]. It is a very active re-education technique for the patient, which uses a device that records and amplifies the activity practiced by the patient, with no electrical stimulation. The purpose is to change an inadequate physiological response or enable the acquisition of a new physiological response, with the possibility of acting on rectal sensitivity, power and coordination[58,62,63].

In the long-term study conducted by Pager et al.[64], which interviewed 120 patients submitted to a four-month FI treatment program based on pelvic floor exercises and biofeedback, the purpose was to assess the volunteers' clinical conditions and quality of life; 83% of them reported improved quality of life and 75% reported reduced symptoms.

Perineal kinesiotherapy is founded on the principle of repetitive voluntary contractions to increase muscle power. This additional power is obtained by combining many motor units, small frequencies and gradually stronger contractions, with few daily repetitions and gradual increase of power intensity and contraction time. Kinesiotherapy is the only method that does not have contraindications[65].

According to Coffey et al.[66], in their studies on the effect of a program that combined progressive physiotherapeutic exercises and electromyographic biofeedback on a woman with fecal incontinence, physiotherapy promoted intestinal continence, improved and increased the pelvic floor musculature control, resulting in enhanced confidence and comfort in social and work situations, as well as fewer restrictions in the patient's physical relation with her partner.

The questionnaires for to quantify fecal incontinence, such as the one proposed by Jorge and Wexner in 1993[67], and the quality of life of patients with FI, such as the Fecal Incontinence of Quality of Life (FIQL), validated into Portuguese by Yusuf et al.[10], are also part of the physiotherapeutic practice and valuable instruments for the evaluation and re-evaluation of the clinical condition of such patients.

CONCLUSION

This review showed that deficient intestinal continence is, in reality, a relevant complication after anorectal surgeries, in which sphincter injuries are common, leading to anal continence disorders; and that physiotherapy can help improve the recovery process of patients submitted to such procedures, promoting sustainable results and effectively preventing or treating postoperative complications. It should be noted that many of these complications, besides increasing personal and hospital costs, could be prevented with an early intervention of physiotherapy, which would speed up the individual's full recovery and improve the quality of life of such subjects.

Thus, further studies are recommended, in the form of systematic reviews, using a higher number of articles, of better quality and evidence levels, for a real analysis of the impact of anorectal surgeries on the anal continence mechanism, therefore promoting discussions on the inclusion of physiotherapy in the postoperative routine of these procedures.

RESUMO: Causada por lesões esfincterianas em variados procedimentos anorretais, a incontinência fecal (IF) representa uma complicação presente em alguns indivíduos submetidos a cirurgias coloproctológicas. Objetivo: Evidenciar a ocorrência de IF como consequência de cirurgias anorretais e expor os recursos fisioterapêuticos no tratamento desta desordem e, com isso, propor a inclusão da fisioterapia como prática rotineira nos pós-operatórios desses tipos de intervenções. Materiais e Métodos: Revisão integrativa realizada a partir de pesquisas nos bancos de dados da biblioteca virtual em saúde – BVS - e do *Physiotherapy Evidence Database* – PEDro - publicados no período de 2000 a 2010, nos idiomas inglês e português. Resultados: Foram selecionados 13 artigos publicados entre os anos de 2001 e 2009, sendo um corte transversal, dois ensaios clínicos não controlados e dez coortes retrospectivos, com nível de evidência entre 2C e 4C, artigos de revisão foram excluídos. Foi evidenciado que a IF representa uma complicação importante de cirurgias anorretais, causando grande impacto sobre a qualidade de vida dos portadores e que a fisioterapia dispõe de recursos eficazes para o tratamento dessa disfunção. Considerações Finais: Recomenda-se a continuação do presente estudo, no formato de revisão sistemática, com um maior número de artigos e de melhores evidências científicas.

Palavras-chaves: cirurgia colorretal; complicações pós-operatórias; incontinência fecal; fisioterapia; prevenção.

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