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Is the physician expertise in digital rectal examination of value in detecting anal tone in comparison to anorectal manometry?

Rodrigo Ambar **PINTO**, Isaac José Felippe **CORRÊA NETO**, Sérgio Carlos **NAHAS**, Ilario **FROEHNER JUNIOR**, Diego Fernandes Maia **SOARES** and Ivan **CECCONELLO**

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ABSTRACT – **Background** – Digital rectal examination (DRE) is part of the physical examination, is also essential for the colorectal surgeon evaluation. A good DRE offers precious information related to the patient's complaints, which will help in decision making. It is simple, quick and minimally invasive. In many centers around the world, the DRE is still the only method to evaluate the anal sphincter prior to patient's management. On the other hand, anorectal manometry (ARM) is the main method for objective functional evaluation of anal sphincter pressures. The discrepancy of DRE depending on the examiner to determine sphincter tonus in comparison to ARM motivated this study. **Objective** – To compare the DRE performed by proficient and non-experienced examiners to sphincter pressure parameters obtained at ARM, depending on examiners expertise. **Methods** – Thirty-six consecutive patients with complaints of fecal incontinence or chronic constipation, from the anorectal physiology clinic of the University of São Paulo School of Medicine, were prospectively included. Each patient underwent ARM and DRE performed by two senior colorectal surgeons and one junior colorectal surgeon prior to the ARM. Patient's history was blinded for the examiner's knowledge, also the impressions of each examiner were blinded from the others. For the DRE rest and squeeze pressures were classified by an objective scale (DRE scoring system) that was compared to the parameters of the ARM for the analysis. The results obtained at the ARM were compared to the DRE performed by the seniors and the junior colorectal surgeons. **Statistical analysis** – Descriptive analysis was performed for all parameters. For the rest and squeeze pressures the Gamma index was used for the comparison between the DRE and ARM, which varied from 0 to 1. The closer to 1 the better was the agreement. **Results** – The mean age was 48 years old and 55.5% of patients were female. The agreement of rest anal pressures between the ARM and the DRE performed by the senior proficient examiners was 0.7 (CI 95%; 0.32–1.0), while for the junior non-experienced examiner was 0.52 (CI 95%; 0.09–0.96). The agreement of squeeze pressures was 0.96 (CI 95%; 0.87–1.0) for the seniors and 0.52 (CI 95%; 0.16–0.89) for the junior examiner. **Conclusion** – More experienced colorectal surgeons used to DRE had a more significant agreement with the ARM, thereafter would have more appropriate therapeutic management to patients with sphincter functional problems. ARM, therefore, persists as an important exam to objectively evaluate the sphincter complex, justifying its utility in the clinical practice.

HEADINGS – Anal canal. Digital rectal examination. Manometry. Muscle tonus.

INTRODUCTION

Anorectal pathophysiological disorders, such as chronic constipation associated with outlet obstruction and fecal incontinence, are common problems in clinical practice. The older population is mainly affected by these conditions, and the increasing age of the population nowadays contributes to anorectal disorders overall[1,2].

Digital rectal examination (DRE) is the main item at anorectal evaluation. It is the simplest and cheapest clinical tool available for the diagnosis of anorectal disorders, which allows anal canal and distal rectum palpation. It is an important tool in everyday practice by evaluating anal and perianal symptoms, blood discharges and for tumor screening. DRE is minimally invasive, not time consuming and cost-effective, performed at the bedside during a medical appointment[3].

Despite its importance, a concern remains about its sensitivity and specificity in detecting anal resting and squeezing tone, internal anal and external anal sphincter lesions and defecation disorders. In fact, the Digital Rectal Examination Scoring System (DRESS) correlates well with conventional anorectal manometry (ARM) for anal resting and squeeze pressure[4]. Additionally, DRE has previously demonstrated a 75% sensitivity and 87% specificity in the identification of dyssynergia compared with conventional ARM[3].

Anorectal manometry is a first-line diagnostic tool for dyssynergic defecation and fecal incontinence, and is used to determine anorectal pressure and sensory function[5,6]. ARM is used for the assessment of fecal incontinence by providing an objective measurement of the sphincter function. It has been previously shown that anal sphincter defects are associated with lower resting and squeeze pressure in women following obstetric sphincter lesions[7-10].

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Universidade de São Paulo, Faculdade de Medicina, Hospital das Clínicas, São Paulo, SP, Brasil.
Corresponding author: Rodrigo Ambar Pinto. E-mail: rodrigo.ambar@hc.fm.usp.br

Some authors consider digital rectal examination as becoming a lost skill. Willian Mayo stated that "the examining physician often hesitates to make the necessary examination because it involves soiling the finger". There is a trend towards technology use to objectively quantify a health condition, leading in some instances to its abuse and avoidance of physical examination[11-13]. A detailed exam must comprise from perianal to distal rectal analysis, static and dynamic, searching for structural and functional disturbances[14].

Considering defecatory disorders, digital rectal examination presents a satisfactory accuracy. Caetano et al. performed a systematic review comprising 2329 patients to determine DRE sensibility and specificity on defecatory disorders. Regarding any diagnosis criteria, the pooled sensibility and specificity were, respectively, 80 and 84%. When using Rome III criteria, sensibility and specificity were, respectively, 78% and 90%[11].

Regarding anal resting and squeezing pressure and sphincter lesions, DRE accuracy remains, at least, controversial. Shek et al.[15] described an observational cross-sectional study of 245 women, 6 to 10 weeks after obstetric anal sphincter injury primary repair. DRE performed by the gynecological team was compared to ultrasound imaging (4D translabial ultrasound). Sensitivity was only 12%. Specificity, positive and negative predictive value were, respectively, 96%, 71%, and 57%. The agreement between ultrasound and DRE was poor (kappa 0.03–0.08). Although, according to other studies, DRE has a robust specificity, helping in selecting a normotonic sphincter without muscular lesions[16,17].

Although it is easy to perform and well tolerated by the patient, digital rectal examination requests some training and some tailored instructions. The attending physician must consider that the DRE before colonoscopy and by urologists aim different objectives, clearly not accomplishing an adequate anorectal functional evaluation. The former intends to check distal rectum and anal patency for the colonoscopy and the latter, to perform prostate palpation. In addition, recently graduated doctors report they are insufficiently prepared to perform a complete digital rectal evaluation[18]. Such discrepancy of DRE depending on each examiner, to determine sphincter tonus, motivated this study.

The objective of this study is to compare experienced colorectal surgeon's accuracy on DRE to a just specialized one, concerning resting and squeezing anal pressures, according to patients' anorectal manometry readings, as a gold-standard measurement.

METHODS

After IRB approval thirty-six consecutive patients from the Colorectal Surgery Service, Department of Gastroenterology, Faculty of Medicine of the University of São Paulo (FMUSP), with functional defecatory disorders, including fecal incontinence or constipation, from March 2013 to February 2014 were evaluated. All patients underwent DRE followed by ARM at the same hospital visit after the first appointment and before any therapeutic intervention. The study involved three colorectal surgeons that performed both DRE and ARM, two were proficient in colorectal physiology (senior attendees) and one just graduated colorectal surgeon, at the first-year experience at the subspecialty of colorectal physiology (junior attendee).

All patients first underwent DRE by one of the two senior attendees and by the junior attendee. For DRE and ARM, patients were positioned in the left lateral decubitus with the lower limbs semi-flexed and head on a pillow (Simms position). Then, with the index finger of the right hand lubricated in gel paste, a DRE of the anal canal for subjective graduation of the basal resting anal pressure was performed. Thereafter, the patient was asked to perform a sphincter contraction movement to verify the anal squeeze pressure.

The DRE performed either by the senior attendees or by the junior attendee was blinded from patient's history. The graduation of rest and squeeze anal tonus were documented before ARM performance, as demonstrated in TABLE 1, according to the Digital Rectal Examination Scoring System (DRESS)[4]. Hereafter, ARM was carried out and the data encountered for rest and squeeze sphincter tonus were compared with DRE graduation, as showed in TABLE 2.

TABLE 1. Graduation of rest and squeeze tonus at digital rectal examination – DRE.

Graduation by DRE (rest or squeeze)	Tonus at DRE (rest or squeeze)
1	Very low tone
2	Low tone
3	Normal tone
4	High tone
5	Very high tone

TABLE 2. Anorectal manometry – ARM findings and ranges for comparison to digital rectal examination – DRE in rest and squeeze sphincter tonus.

Rest sphincter tonus at DRE	ARM rest pressure range (mmHg)
Very low tone	0 – 20
Low tone	20 – 40
Normal tone	40 – 70
High tone	70 – 110
Very high tone	110 – 150
Squeeze sphincter tonus at DRE	ARM squeeze pressure range (mmHg)
Very low tone	< 80
Low tone	80 – 100
Normal tone	100 – 180
High tone	180 – 220
Very high tone	220 – 260

Thus, the values of rest and squeeze pressures obtained with DRE and ARM were compiled in an Excel spreadsheet.

Anorectal manometry was performed with Alacer Biomédica® device with eight radial channels water perfused catheter through the stationary technique to measure objective values of resting and squeeze pressures, puborectalis relaxation through Valsalva maneuver, anal reactive inhibitory reflex, sensitivity, and capacity of the rectum. The catheter is pulled out at one cm intervals from the rectum at 6 cm to the end of the anal canal at 0 cm, obtaining the high-pressure zone of the anal canal where pressures were 50% or more, higher than rectal pressures. The high-pressure zone usually has 2 to 3 cm in length. The mean resting pressure is obtained by the average pressure at the high-pressure zone. The mean squeeze

tone is the average of the pressures obtained at the high-pressure zone during the squeeze. The rest and squeeze tone of ARM were recorded and used at this study to compare with the impressions previously obtained by the examiners at DRE.

Statistical analysis

The statistical analysis was descriptive for the sociodemographic data. Gamma index was used for the comparison between the data obtained by DRE and ARM. Intra-observer analysis of each of the three colorectal surgeons and inter-observer analysis between the beginner examiner and the two senior ones were performed. The variation of the Gamma index is between 0 and 1. Values between 0 and 0.3 indicate a poor agreement, between 0.3 and 0.7 moderate and above 0.7 denote a strong concordance between two variables.

RESULTS

Patients evaluated had a mean age of 48 years old (25–60) and 55.5% were female. Regarding diagnosis, 17 (47.2%) patients had fecal incontinence, 13 (36.1%) had obesity preparing for surgery, 5 (13.9%) had chronic constipation and 1 (2.8%) had an anal fistula. When analyzing the resting and squeeze tone of the anorectal sphincter complex, comparing the DRE of the senior attendees with the junior attendee, correlating the values obtained with ARM, the results are demonstrated in TABLES 3 and 4.

TABLE 3. Subjective (digital rectal examination – DRE) and objective (anorectal manometry – ARM) graduation of anorectal resting pressure.

Parameters	Very low	Low	Normal	High	Very high
Senior examiners	13.04%	26.09%	52.17%	8.7%	0%
Beginner examiner	2.78%	22.22%	72.22%	2.78%	0%
Anorectal manometry	6.45%	25.81%	58.06%	9.68%	0%

TABLE 4. Subjective (digital rectal examination – DRE) and objective (anorectal manometry – ARM) graduation of anorectal squeeze pressure.

Parameters	Very low	Low	Normal	High	Very high
Senior attendees	30.43%	26.09%	39.13%	4.35%	0%
Beginner attendee	13.89%	33.33%	50%	2.78%	0%
Anorectal manometry	32.26%	22.58%	41.94%	3.23%	0%

For the evaluation of the anal rest tone, the agreement between ARM and the DRE of the senior examiners resulted in a Gamma index of 0.7 (95% CI, 0.32–1.0), whereas for the beginner it was 0.52 (95% CI, 0.09–0.96 – TABLE 5)

Furthermore, the agreement between the DRE and ARM in the evaluation of squeeze pressures was 0.96 for the senior examiners (95% CI, 0.87–1.0) and 0.52 for the beginner (95% CI, 0.16–0.89 – TABLE 6)

TABLE 5. Agreement between resting pressures at Digital Rectal Examination – DRE and Anorectal manometry – ARM.

Examiner	Gamma	IC 95%	Interpretation
Senior examiners	0.7	0.32–1.0	Moderate to strong agreement
Beginner examiner	0.52	0.09–0.96	Poor, moderate or strong agreement

TABLE 6. Agreement between squeeze pressures at digital rectal examination – DRE and anorectal manometry – ARM.

Examiner	Gamma	IC 95%	Interpretation
Senior attendees	0.96	0.87–1.0	Strong agreement
Beginner attendee	0.52	0.16–0.89	Poor, moderate or strong agreement

DISCUSSION

Proctologic examination is usually performed with little or no emphasis on the functional evaluation of the sphincter complex. Thus, little information is obtained regarding resting or squeeze sphincter pressures, as well as the Valsalva maneuver, to investigate paradoxical puborectalis contraction is poorly explored on DRE.

Therefore, patients with complaints of anal incontinence are not properly examined for their functional problems and the physician proceeds for the anorectal manometry to redeem all doubts left unclear after an inadequate DRE[5-7].

This study found a moderate to a strong agreement between the DRE performed by more experienced examiners and the values obtained in anorectal manometry in the analysis of anal resting pressures (Gamma 0.7) and a strong correlation of the squeeze pressures (Gamma 0.96), using DRESS. However, the DRE of the beginner examiner agreement was lower for the evaluation of both sphincter pressures in comparison to the ARM (Gamma 0.52 for both). Therefore, similar to previous studies, this study highlights the greater accuracy of DRE performed by professionals more skilled with anorectal physiology and pelvic floor disorders evaluation than by physicians not so qualified in this analysis[17,19].

The first study to compare DRE with ARM, at the beginning of functional anorectal exams in 1989 showed good correlations for incontinent patients and continent controls, concluding that DRE was equally as good as ARM for the assessment of anal sphincter function[20].

Orkin et al.[4], graduated by DRE both, resting and squeeze pressures of the anal canal, in values between 0 and 5. In this study, 0 meant non-expressive, 1 very low, 2 low, 3 normal, 4 high and 5 very high sphincter pressures. This study observed in 383 patients with defecation dysfunction an excellent agreement between the DRE and ARM with a Spearman correlation coefficient of 0.82 for resting pressure and 0.81 for squeeze pressures. Thus, they report that the clinical evaluation of the internal and external anal sphincter pressures is most useful in clinical practice. Similarly, Buch et al.[19] demonstrated, through the analysis of 191 patients, a significant correlation between DRE and ARM for both rest and squeeze pressures in patients with fecal incontinence, obstructed defecation and controls. Furthermore, DRE has previously demonstrated a 75% sensitivity and 87% specificity in the identification of dyssynergia compared with conventional ARM results[3].

Roos et al.[21], evaluating 531 consecutive female patients who had obstetric anal sphincter injuries and primary sphincter tear correction with suture, observed that the greater the sphincter lesion the worse were incontinence symptoms thereafter. ARM also shown lower resting and squeeze pressures in patients with greater lesions, and anorectal ultrasound showed defects either of the internal sphincter or combined defects of the external sphincter.

Recently, Coura et al.[22] evaluated DRE in 76 incontinent patients, trying to correlate with sphincter defects on tridimensional ultrasound. Their comparison with ARM showed that women with abnormal resting tone had lower resting pressures than women with a normal tone at DRE (P=0.0001). Women with abnormal squeeze tone had lower incremental pressures than women with a normal tone at digital rectal examination (P=0.017). The authors did not have a specific score for the DRE to correlate with ARM. Regarding sphincter defects, DRE sensitivity increased linearly from small to extensive external anal sphincter defects (P=0.001). However, the specificity of DRE was poor (27.78%) in distinguishing small from extensive defects of both sphincters. Similarly, Jeppson et al.[16] demonstrated a sensitivity of 82%, specificity of 32%f or detecting a complete external sphincter defect on endoanal ultrasound. The authors concluded that DRE has poor specificity for detecting anal sphincter defects seen on endoanal ultrasound, highlighting the importance of complementary exams of the anorectal region to guide therapeutic strategies.

High-Resolution ARM (HRAM) was recently developed with the intent to substitute conventional ARM[23]. HRAM is therefore expected to increase diagnostic accuracy and guide optimal therapy for functional anorectal disorders[24]. However, Soh et al.[17], evaluating 309 patients with chronic constipation (268) and fecal incontinence (41), have shown a high sensitivity (93.2%) and positive predictive value (91%) of DRE as compared to HARM for the diagnosis of pelvic dyssynergia. Authors suggest that the DRE could be used as a low-cost screening method for the diagnosis of this disorder. On the other hand, the agreement for the evaluation of resting tone was poor between the two methods, when compared with the kappa coefficient (0.079, P=0.368).

At the present study, the analysis of the impressions obtained for internal and external anal sphincter pressures by senior examiners tend to be super estimated for sphincter problems, since they are used to evaluate anorectal problems. On the other hand, the junior examiner, inexperienced with the evaluation of sphincter tonus at his practice, tends to sub estimate such sphincter problems. This differences between the expertise of the examiner in comparison to an objective method stand out the importance of ARM as a complimentary exam that can redeem differences between one or other examiner, not depending on their level of expertise.

The limitations related to this prospective study are the limited sample of patients and lack of anatomical correlation using endoanal ultrasound in incontinent patients. On the other hand, the prospective design of this study and blindness of the examiners of patient's history would strengthen the study and reduce bias.

CONCLUSION

More experienced colorectal surgeons used to digital rectal examination had a more significant agreement with the anorectal manometry for sphincter tonus on rest and squeeze, thereafter would have more appropriate therapeutic management to patients with sphincter functional problems. Anorectal manometry, therefore, persists as an important exam to objectively evaluate the sphincter complex, justifying its utility in the clinical practice.

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Authors' contribution

Pinto RA: patient recruitment, data collection, examined all patients, paper write. Corrêa Neto IJF: helped in patient recruitment, data review, examined most patients, review of statistical analysis and literature review. Nahas SC: supervision of patient recruitment, supervision of literature review and paper review. Froehner Junior I: examined most of the patients referred for the study, data review and support of statistical analysis, tables review. Soares DFM: referred patients, tables confection and review, paper review. Cecconello I: senior author supervised all work during the whole process and paper final review.

Orcid

Rodrigo Ambar Pinto. Orcid: 0000-0002-6194-0288.
Isaac José Felippe Corrêa Neto. Orcid: 0000-0003-3756-0135.
Sérgio Carlos Nahas. Orcid: 0000-0002-2268-4146.
Ilario Froehner Junior. Orcid: 0000-0002-0823-0674.
Diego Fernandes Maia Soares. Orcid: 0000-0002-2286-7866.
Ivan Cecconello. Orcid: 0000-0002-3535-4170.

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RESUMO – **Contexto** – Exame anorretal digital (EAD) faz parte do exame físico, também é essencial para a avaliação do cirurgião colorretal. Um bom EAD oferece informações preciosas relacionadas às queixas do paciente, que auxiliam na tomada de decisões. Sua realização é simples, rápida e minimamente invasiva. Em diversos centros ao redor do mundo, o toque retal ainda é o único método para avaliar o esfíncter anal antes do tratamento. Por outro lado, a manometria anorretal (MAR) é o principal método para avaliação funcional objetiva das pressões esfincterianas. A discrepância entre o EAD, dependendo do examinador para determinar o tônus esfincteriano em comparação à MAR motivou este estudo. **Objetivo** – Comparar o EAD com os parâmetros de pressão esfincteriana obtidos na MAR, dependendo da experiência dos examinadores. **Métodos** – Trinta e seis pacientes consecutivos com queixas de incontinência fecal ou constipação crônica, do ambulatório de Fisiologia Anorretal da Faculdade de Medicina da Universidade de São Paulo, foram prospectivamente incluídos. Cada paciente foi submetido a MAR e EAD realizados por dois cirurgiões colorretais seniores e um júnior antes da MAR. A história dos pacientes propositalmente omitida dos examinadores, e os resultados de cada examinador foram cegos dos demais. Para o EAD, as pressões de repouso e contração foram classificadas por uma escala objetiva (EAD Scoring System), realizada pelos examinadores seniores e pelo júnior em todos os pacientes, que foi comparada com os parâmetros da MAR para a análise. **Análise estatística** – A análise descritiva foi feita para todos os parâmetros. Para as pressões de repouso e contração, o índice Gamma foi utilizado para a comparação entre o EAD e a MAR, que variou de 0 a 1. Quanto mais próximo de 1 melhor a concordância entre os dois métodos de avaliação. **Resultados** – A idade média foi de 48 anos e 55,5% dos pacientes eram do sexo feminino. A concordância das pressões anais de repouso entre a MAR e o EAD realizadas pelos examinadores seniores, proficientes, foi de 0,7 (IC 95%; 0,32–1,0), enquanto para o examinador júnior, menos experiente, foi de 0,52 (IC95%; 0,09–0,96). A concordância das pressões de contração foi de 0,96 (IC 95%; 0,87–1,0) para os examinadores seniores e de 0,52 (IC 95%; 0,16–0,89) para o júnior. **Conclusão** – Cirurgiões colorretais mais experientes, o EAD teve concordância mais significativa com a MAR, o que poderia levar a um manejo terapêutico mais adequado aos pacientes portadores de doença anorretais funcionais. A manometria anorretal permanece, portanto, como método de avaliação objetiva da função esfincteriana.

DESCRITORES – Canal anal. Exame retal digital. Manometria. Tono muscular.

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