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Research Article

# Air Filled Manometry (Anopress): Results in an High Volume Coloproctological and Pelvic Center

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## Abstract

**Background:** Functional anorectal disorders are difficult to diagnose and often require clinical tests that study the function beyond the anatomy of the pelvic floor. Manometry is one of the most used. Recently, THD Anopress manometer has been introduced to facilitate these measurements.

**Aim:** The aim of this study is to provide standard and pathological values observed in people with anorectal pathology due to functional disorders in order to facilitate interpretating results.

**Methods:** This is a retrospective observational study conducted from 2020-2022 involving 300 patients with functional anorectal disorders that had access to our coloproctological and pelvic department. Inclusion criteria are patient with obstructed defecation syndrome, anal fissures and fecal incontinence. Exclusion criteria are: psychiatric disorders, inflammatory bowel diseases and age lower than 18 years.

**Results:** In our experience the normal sphincteric tone in a healthy patient is between 30 to 40 mmHg. Anal reflex in a healthy patient is attested from 40 to 50 mmHg and the cough reflex under from 50 to 60 mmHg. The squeeze value is almost 100% higher than the basal one. The anorectal reflex normally is lower than the resting value but we obtained higher values even in asymptomatic patients. From our data we have noticed that in patients suffering from anal fissure the resting pressure mostly was normal but squeeze pressure usually was 200% higher than the resting. In patient with obstructed defecation syndrome the anorectal reflex is usually higher than the normal values.

**Conclusion:** THD Anopress manometer is portable and allows you to use a normal clinical room to perform the functional study despite the use needs special expertise, in comparison to the traditional water perfused manometer, Anopress can be easily used. This study is intended to help other physicians to interpret the results due to insufficient experience with this new device.

**Keywords:** Anorectal Disorder; Manometry; Pelvic Floor; Perineum; Sphincter Pressure

## Introduction

Anorectal disorders are complex pathologies, often evaluated through anorectal functional tests. Functional disorders represent almost 20% of anorectal diseases and they are often cause of pathologies in this district. They are difficult to diagnose and treat and often require complex functional testing of the anal canal. Common examples of ano-rectal pathologies often associated with functional disorders are: anal fissures, obstructed defection syndrome, incontinence [1,2]. These conditions require a careful clinical examination including anatomical and functional findings of the anal sphincter [3]. A useful test to define the physiological or pathological condition of the anal sphincter is manometry [4,5]. Initially, water filled balloons were used to study anorectal pressure. These balloons were connected to an external pression transducer; the balloon had the drawback of increasing anal pressure due to his form which stimulated the wall of the anal canal [6]. Lately, balloon manometer were replaced by multichannel water perfused manometers that became the gold standard to perform this test (Figure 1). This device is durable, reliable but requires long testing times and it is not portable. It records the pression of the anal canal in both longitudinal and radial axis [7,8]. A new portable device "THD Anopress "(THD Worldwide, Correggio, Italy) has currently been introduced (Figure 2). This new manometer consists of catheters filled with air. It is equipped with a monitor where the results can be immediately displayed and they are easily interpretable. It is portable, allowing the execution of the test in any space, even during surgery. In recent studies Anopress has proven to be as accurate as traditional manometry [1,9] Considering the recent introduction of this device, there are no sufficient standardized values to interpret the results.

**Figure 1**: Multichannel water perfused manometer.


**Figure 2**: THD Anopress®.

## Aim of the Study

The aim of this study is to provide standard and pathological values observed in people with anorectal pathology due to functional disorders in order to facilitate interpretating results. The propose of this study is to help other surgeons interpret the results obtained with the Anopress device.

## Materials and Methods

This is a retrospective observational study conducted from 2020-2022 involving 300 patients with anorectal pathologies due to functional disorders who had access to our coloproctology and pelvic department. This study was performed at the Zucchi Clinical Institute in Monza. We included all the patients suffered of an obstructed defecation syndrome (also known as spastic pelvic floor syndrome) [10], anal fissure, or incontinence [11]. Exclusion criteria were: age less than 18 years, psychiatric disorders and inflammatory bowel disease. All patients gave full informed consent to testing and participation in the study. The demographic characteristics of the patient are shown in table 1. We analyzed 180 female and 120 males. The average age is 62 years.

| | |
|---|---|
| Number of patients | 300 |
| Age (average) | 62 years |
| Number of female patients | 180 |
| Previous natural delivery | 120 |
| Previous pelvic trauma | 4 |

**Table 1**: Demographic characteristics.

## Procedure

The tests were performed by an experienced general surgeon and proctologist assisted by a resident. All test were executed in a consulting room of the hospital. No bowel preparation was required. Before starting the test, the THD Anopress was calibrated by recording the air pressure on average over approximately ten seconds. Once ready, the pressure gauge is inserted into the anus using an anesthetic gel. The first value measured was the anal reflex, which is the value obtained at the introduction of the device and consist,normally, of an increase in pressure.

After 20 seconds we measured the rest pressure and the cough reflex by asking the patient to cough for 5 times; we took as final value the higher value during the coughing. Both anal and coughing reflex are important to evaluate the sympathetic and parasympathetic function. The cough reflex is absent in neurofunctional pelvic floor disease. We subsequently tested the value of the compression by asking the patient to contract the external anal sphincter as much as possible; we considered the highest value measured in the first 10 seconds and the average value. This measurement allows you to estimate the function of the voluntary muscles of the pelvic floor. The last value measured was the recto-anal inhibition reflex that is the reflex measured during pelvic relaxation while the patient is defecating. Evacuation is initiated with a colonic reflex that moves the feces in the rectum ampulla inducing urge to defecate. Once fecal material is in the rectum it induces an incrementation of the pressure that cause the internal sphincter relaxation termed recto-anal inhibition reflex [13-15]. For this last measurement we asked to the patient to perform a Valsalva's maneuver which also induces internal anal sphincter relaxation. Once the test was concluded, the device was connected to a computer and commented by the doctor that performed the test. The mean time to complete and record the exam was 5 minutes.

### Statistical Analysis and Results

For all values detected an average measure +- 10 mmHg was calculated. Our results were compared to the normal value reported in literature [16-18]. According to literature data the normal sphincteric tone in a healthy patient is between 30 to 40 mmHg. The mean time to achieve the resting pressure was 15 seconds after the insertion of the device. Anal reflex in a healthy patient is attested from 40 to 50 mmHg. The cough reflex under normal condition was measured from 50 to 60 mmHg. The squeeze value is almost 100% more the basal condition in a healthy patient. The anorectal reflex normally is lower than the resting value in healthy patients because normally during evacuation sphincter tone reduces (Table 2,3), but, we obtained higher values even in asymptomatic patients. From our data we've noticed that in patients suffering from anal fissure the resting pressure mostly was normal. Otherwise squeeze pressure usually was 200% more than the resting value (while in a healthy patient is 100% more than the basal value) In patient with obstructed defecation syndrome the anorectal reflex usually is higher than the normal values. In few cases of obstructed defecation syndrome, we observed a normal anorectal reflex.

| | |
|---|---|
| Resting pressure | 30-40 mmHg |
| Anal Reflex | 40-50 mmHg |
| Cough Reflex | 50-60 mmHg |
| Squeeze pressure | 80-100 mmHg |
| Anorectal relaxing reflex | <30-40 mmHg |

**Table 2**: Results. Normal Values.

| | |
|---|---|
| Resting pressure in hypotony or hypertonic | <30 or >40 mmHg |
| Squeeze pressure in anal fissure | 120-150 mmHg |
| Anorectal relaxing reflex in obstructed defecation Syndrome | >30-40 mmHg |

**Table 3:** Pathological values.

## Discussion

Traditional measurement of pressure in the anal canal is performed using a water perfused manometer. This device consists of catheters with pression sensors that measure luminal anorectal pressure at different levels. The final value is an average of all the numbers provided by these sensors [19]. Water perfused manometer requires high expertise and dedicated space to perform the test while is fragile and not portable. To date, it represents the gold standard, used to evaluate a physiological study of the anorectum [20,21]. In recent years, as we said, another device took over. THD Anopress manometer consists of an air- filled catheters that measure the pressure of all the length of anal canal . It is portable and allows you to use a normal clinical room to perform the functional study. Despite the use needs special expertise, in comparison to the traditional water perfused manometer, Anopress can be easily used. In fact, in some hospitals it is used also in obstetrics and gynecology to study the post-partum functional disorders, such as incontinence. This consent to address women that suffer from post-partum incontinence directly to specialized centers for recovery and follow up [9]. In our study we collected physiological and pathological value obtained with Anopress. This study is intended to help other physicians to interpret the results due to insufficient experience around this new device. There is little information in literature about Anopress THD. Our study can help in daily life clinicians that use this new device. The limitation of this study is the low number of patients. Other limitations are that value obtained with Anopress and standard water filled manometer are hardly compared, due to the difference in the calibration values of the different machines. The strength of this study is that there are not standard pathological values or guidelines regarding the measurement with Anopress. Another strong point is a long year experience in pelvic floor diseases of our center.

## Conclusions

THD Anopress manometer is portable and allows you to use a normal clinical room to perform the functional study despite the use needs special expertise in comparison to the traditional water perfused manometer. However, further studies are needed to obtain guidelines on the interpretation of THD Anopress results to start using this new device as a gold standard given its feasibility.

**Informed consent statement:** The patients of this study signed inform consent.

**Conflict-of-interest statement:** All Authors declare to have no conflict of interest.

**Data sharing statement:** no additional data are available.



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