



LASER in hemorrhoidal disease management Pros and Cons

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Hemorrhoidal disease

Hemorrhoidal disease is ranked first amongst diseases of the rectum and large intestine, and the estimated

- Worldwide prevalence ranges from 2.9% to 27.9%, of which more than 4% are symptomatic .

- Approximately, one third of these patients seek physicians

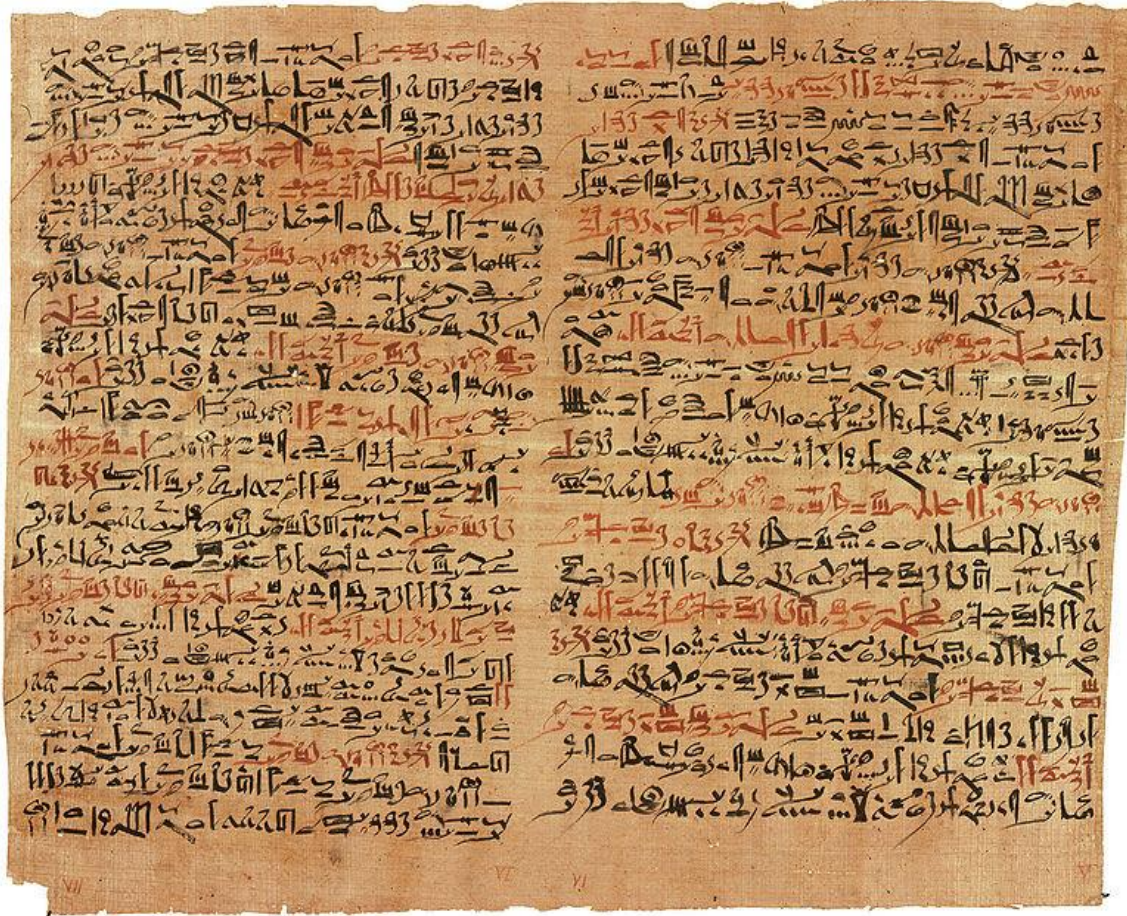
Evolution of Surgical Management of Hemorrhoidal Disease

(PRE-MODERN ERA)

Old Testament and **Egyptian scriptures** are the first documents that mentioned anal symptoms suggestive of hemorrhoids and their therapy



Edwin Smith Papyrus (1700 BC) and the **Ebers Papyrus** (1500 BC) recommend astringent lotions containing honey, myrrh, flour, ibex fat, and sweet beer for anal symptoms that are strongly suggestive of symptomatic hemorrhoids. However, no surgical therapy is reported.

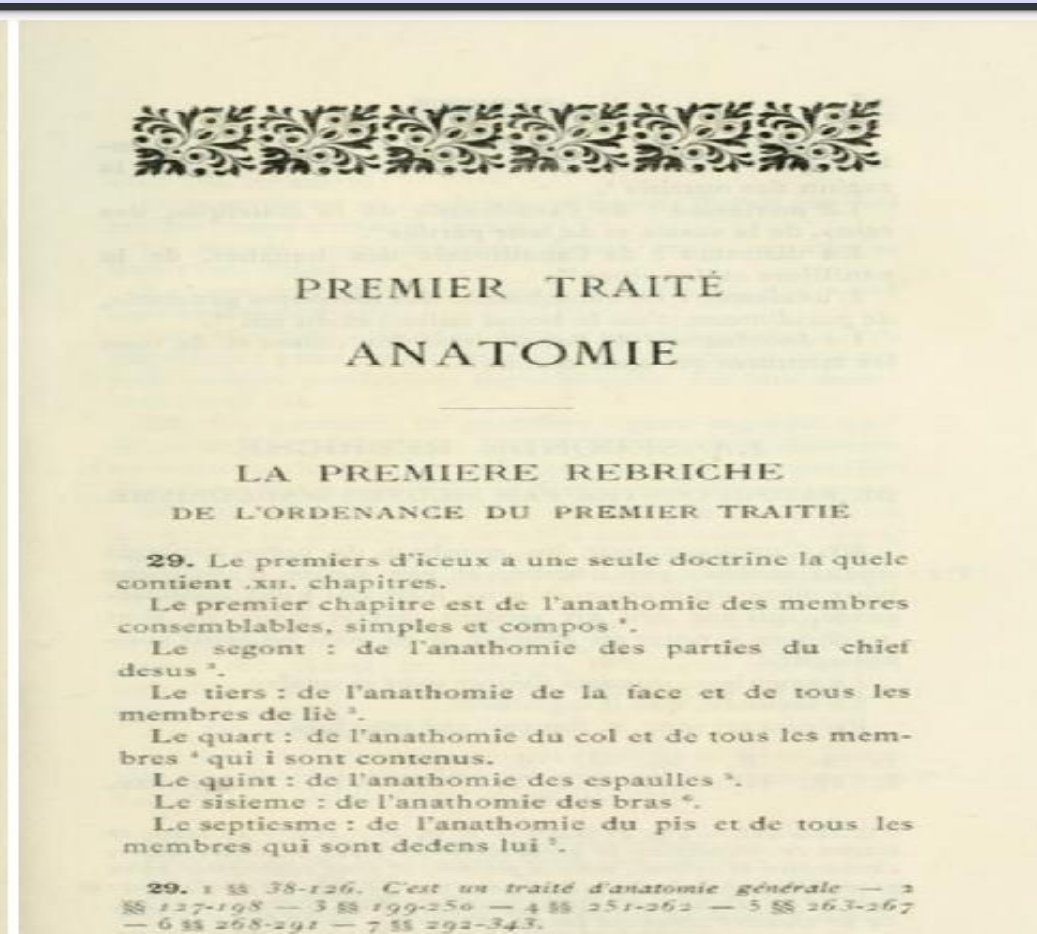
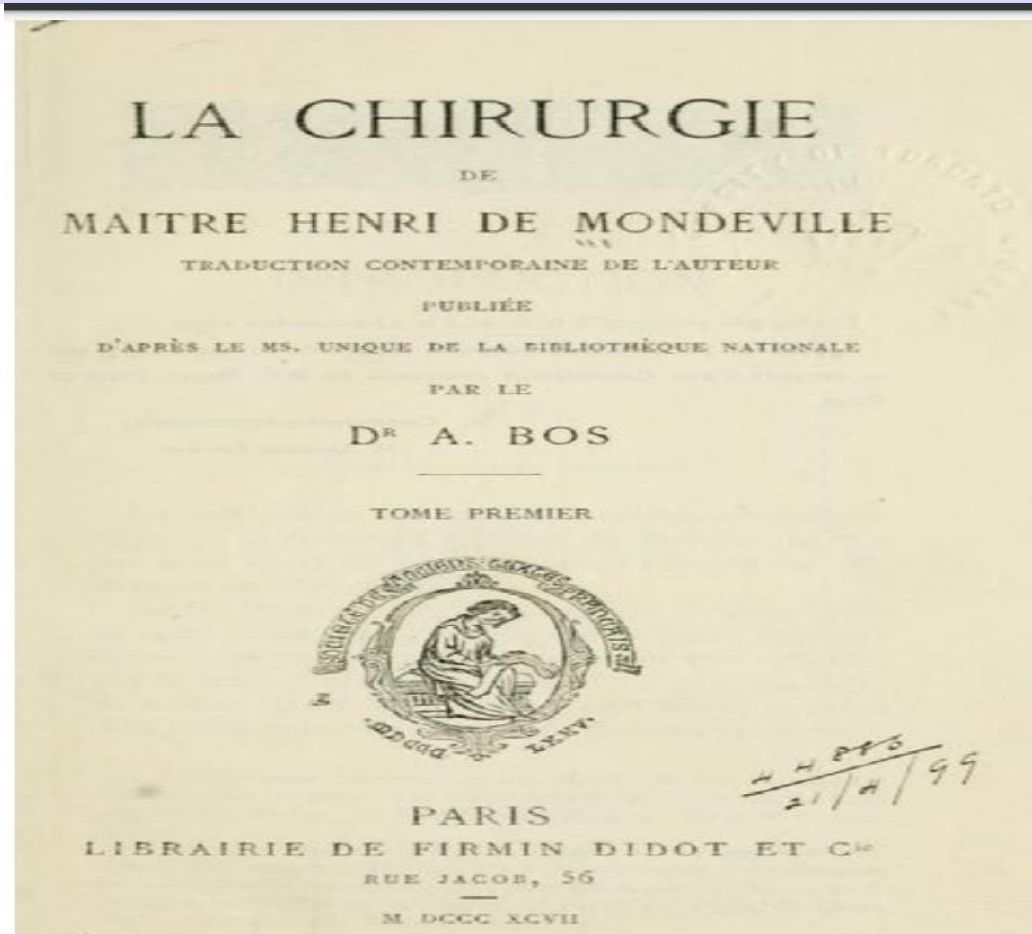


The world's oldest known surgical treatise

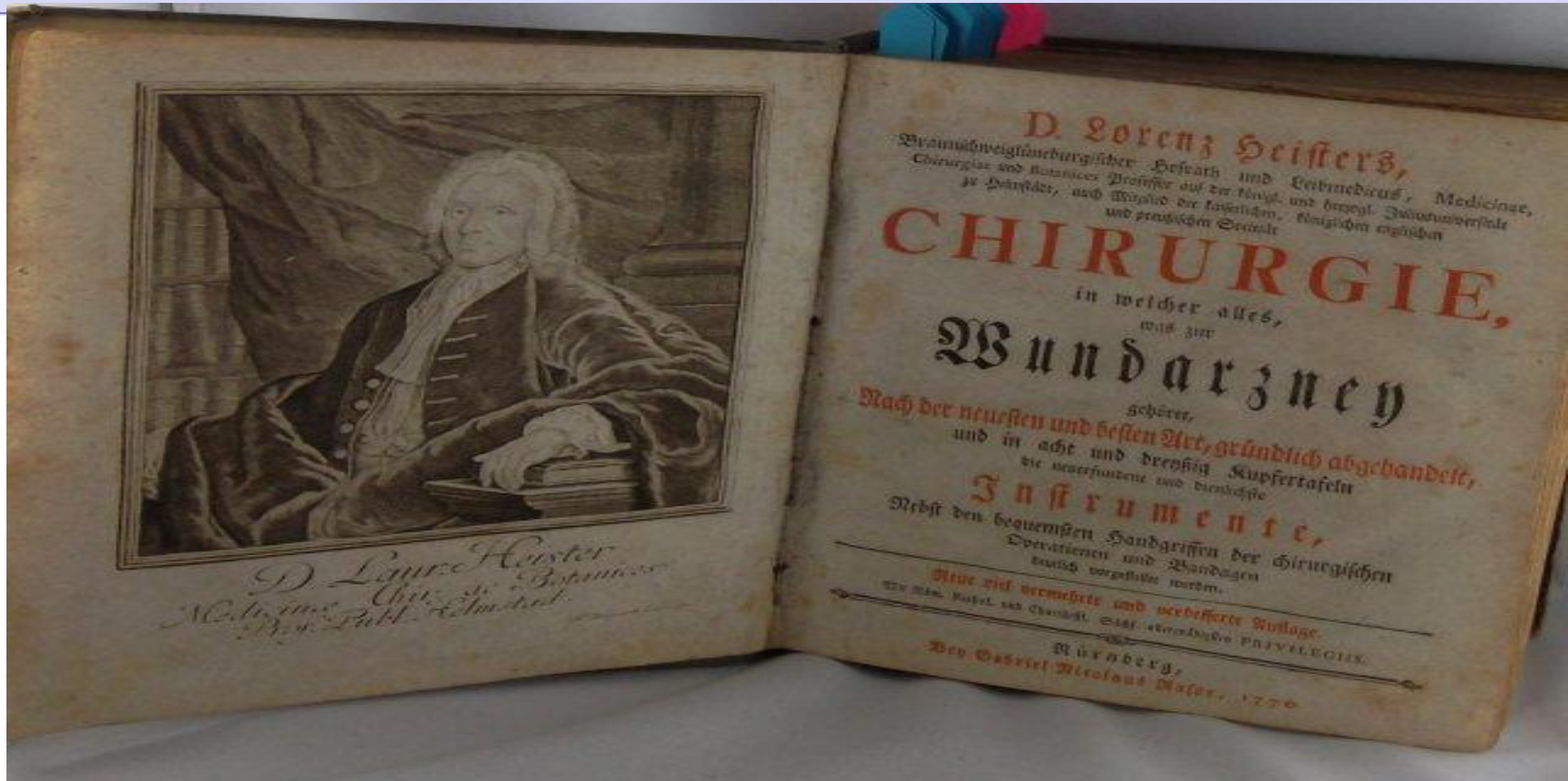
Hippocrates (460–375 BC), the father of Medicine, was the first author to propose a surgical therapy for symptomatic hemorrhoids.



Herni de Mondeville (1260–1320), French surgeon who made a significant number of contributions to anatomy and surgery, and was the first Frenchman to author a surgical treatise, La Chirurgie (1306-1320)..



Lorenz Heister, in the book Chirurgie (1739), described the “method of the ancient too cruel, and often pernicious”



Did Bad Hemorrhoids Cause Napoleon to Lose at Waterloo?

It is worth mentioning that the defeat of Napoleon at Waterloo on June 18, 1815 was partially attributed to an episode of presumably thrombosed hemorrhoids that likely affected his performance on the crucial day of the battle



Evolution of Surgical Management of Hemorrhoidal Disease

(MODERN ERA)

Evolution of Surgical Management of Hemorrhoidal Disease (MODERN ERA) (19th Century)

Three main surgical trends characterized the 19th century: anal stretching, excision, and sclerotherapy.

❑ In 1835, Frederick Salmon founded in London “St Mark’s Hospital for Fistula and other Diseases of the Rectum” (officially opened in 1853) . This was the first institution dedicated to the treatment of anorectal disease Salmon first proposed anal stretching to treat hemorrhoids

❑ In 1882, Walter Whitehead (1840–1913) proposed a radical approach for the excision of circumferential hemorrhoids . He proposed “the excision of the complete ring of pile-bearing mucous membrane” by a circular incision at the level of mucocutaneous border

❑ In 1869, James Morgan, a surgeon in Dublin, first described sclerotherapy using iron sulfate

Evolution of Surgical Management of Hemorrhoidal Disease (MODERN ERA) (20th Century)

- ❑ The first part of the 20th century was characterized by the affirmation of open hemorrhoidectomy as the gold standard treatment for HD **Milligan-Morgan operation**
- ❑ In 1955, **James A. Ferguson** described closed hemorrhoidectomy
- ❑ In 1963, **James Barron** described rubber banding ligation, an office-based procedure for early stage hemorrhoids, reporting only four cases of bleeding among 200 treated patients
- ❑ In 1995, **Morinaga** described hemorrhoidal artery ligation (HAL) or transanal hemorrhoidal dearterialization (THD) based on Doppler-guided ligation of the terminal branches of the hemorrhoidal arteries by a designated proctoscope associated with a Doppler probe
- ❑ In 1998, **Antonio Longo** described stapled hemorrhoidectomy, referred to as the Longo technique or stapled hemorrhoidopexy (which seems more appropriate)

Evolution of Surgical Management of Hemorrhoidal Disease (MODERN ERA) (21st Century)

In the first 20 years of the 2000s, the surgical treatments for hemorrhoids have been moving in two directions:

- on one hand, traditional techniques have been modified according to new devices to increase postoperative outcomes; harmonic, ligasure
- on the other hand, minimally invasive techniques have been developed to reduce postoperative pain, need for hospital admission, and injuries to the structures of the anal canal.

Evolution of Surgical Management of Hemorrhoidal Disease (MODERN ERA)

- According to the “vascular theory,” which postulates the blood overflow from the superior hemorrhoidal artery as the main cause of hemorrhoidal disease, and thanks to the positive results of THD, Hemorrhoids Laser Procedure (HeLP) and Emborrhoid were developed as new mini-invasive surgical treatments.
- HeLP, first described in 2011 by Paolo Giamundo , involves selective closure of the terminal branches of the superior rectal arteries, which were identified by a 20 MHz Doppler probe, 3 cm proximal to the dentate line using a laser optic fiber used mainly for grade I and II HD
- Although recently, a combination with mucopexy (HeLPexx) has been described , widening the indications for advanced HD

Giamundo P, Cecchetti W, Esercizio L, Fantino G, Geraci M, Lombezzi R, et al.. Doppler-guided hemorrhoidal laser procedure for the treatment of symptomatic hemorrhoids: experimental background and short-term clinical results of a new mini-invasive treatment. *Surg Endosc.* (2010) 25:1369–75. 10.1007/s00464-010-1370-

Evolution of Surgical Management of Hemorrhoidal Disease (MODERN ERA)

- ❑ The current mainstream surgical management of HD is represented by using office-based procedures and minimally invasive techniques whenever possible
- ❑ the wide range of options available allows a tailored approach because “no one size fits all options”

Non-surgical treatment of hemorrhoidal disease

Dietary advise

Recommend high fiber diet with sufficient fluid intake

Modify defecatory habit

- Straining has never been proved to have a causative role in piles
- Excessive straining precipitates symptoms or worsens existing ones
- Avoid constipation

Topical treatment (cream / suppository)

- antiseptic
- local anaesthetic
- steroids (atrophy of anoderm, eczema)
- Nonsteriodal
- Vasoactive
- anti-thrombotic

Oral drug – phlebotropic drug (micronized purified flavonoid fraction)

Surgical treatment

1. Rubber band ligation
2. Infrared photocoagulation
3. Bipolar diathermy
4. Sclerotherapy
5. Cryotherapy
6. Open Haemorrhoidectomy Milligan-Morgan hemorrhoidectomy is the gold standard
7. Closed haemorrhoidectomy
8. Ligasure or harmonic hemorrhoidectomy
9. Stapled haemorrhoidectomy
10. LASER hemorrhoidal ablation

Surgical treatment

Milligan-Morgan hemorrhoidectomy is the gold standard.

Post hemorrhoidectomy pain is the commonest problem associated with the surgical techniques.

- ❑ The other early complications are

- ❑ urinary retention (20.1%),

- ❑ bleeding (secondary or reactionary) (2.4%–6%) and

- ❑ subcutaneous abscess (0.5%).

- ❑ The long-term complications include anal fissure (1% -2.6%), anal stenosis (1%), incontinence (0.4%), fistula (0.5%) and recurrence of hemorrhoids .

What is LASER?

LASER = **L**ight **A**mplification by **S**timulated **E**mission of **R**adiation

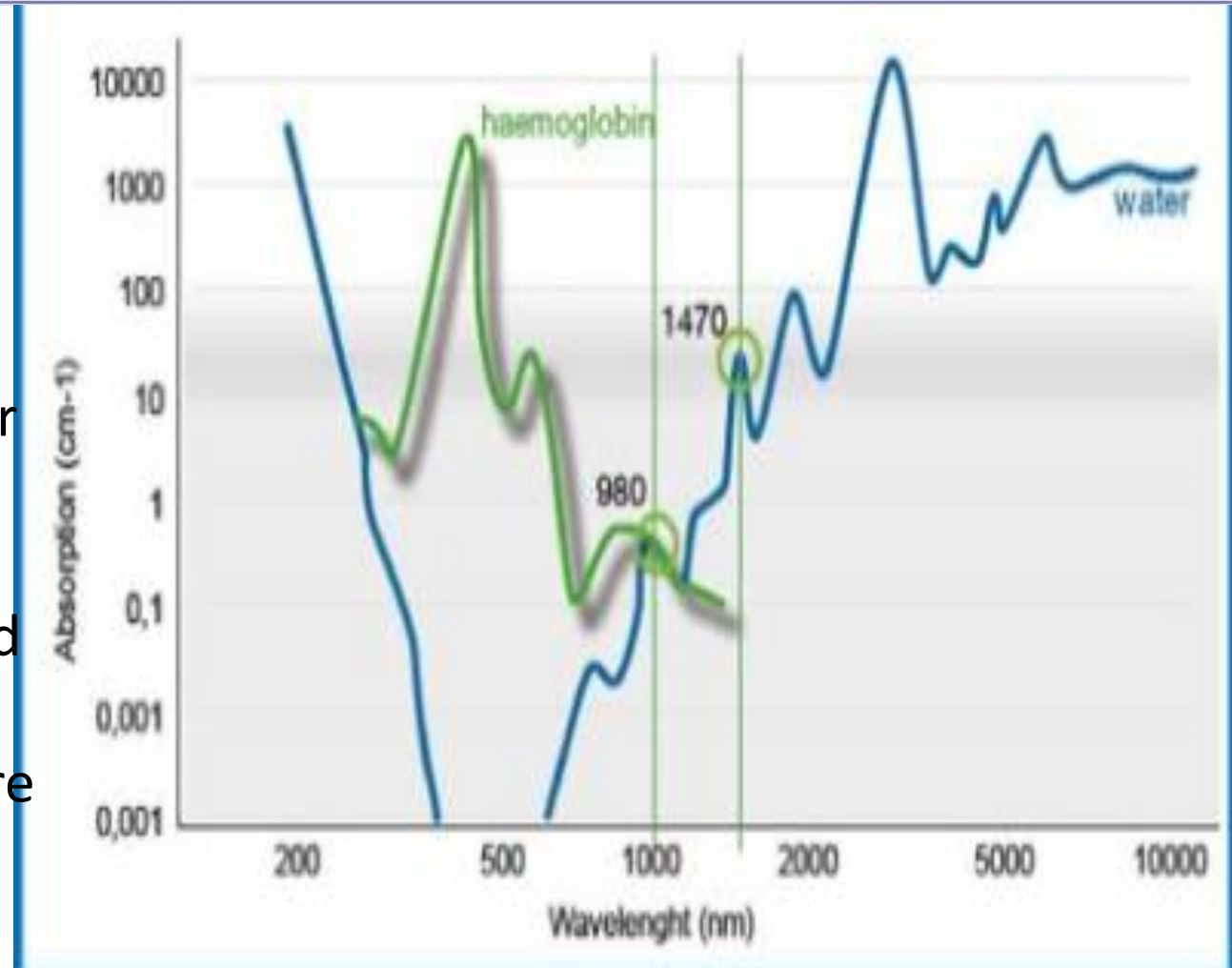
- Coherent light = one color
- Depends on material used
- One color = predictable tissue interaction

Light transforms into heat for soft tissue cutting, ablation, vaporization, hemostasis, coagulation

980 nm and 1470 nm wave length used in hemorrhoidal ablation

Why 980 nm and 1470 nm wave length?

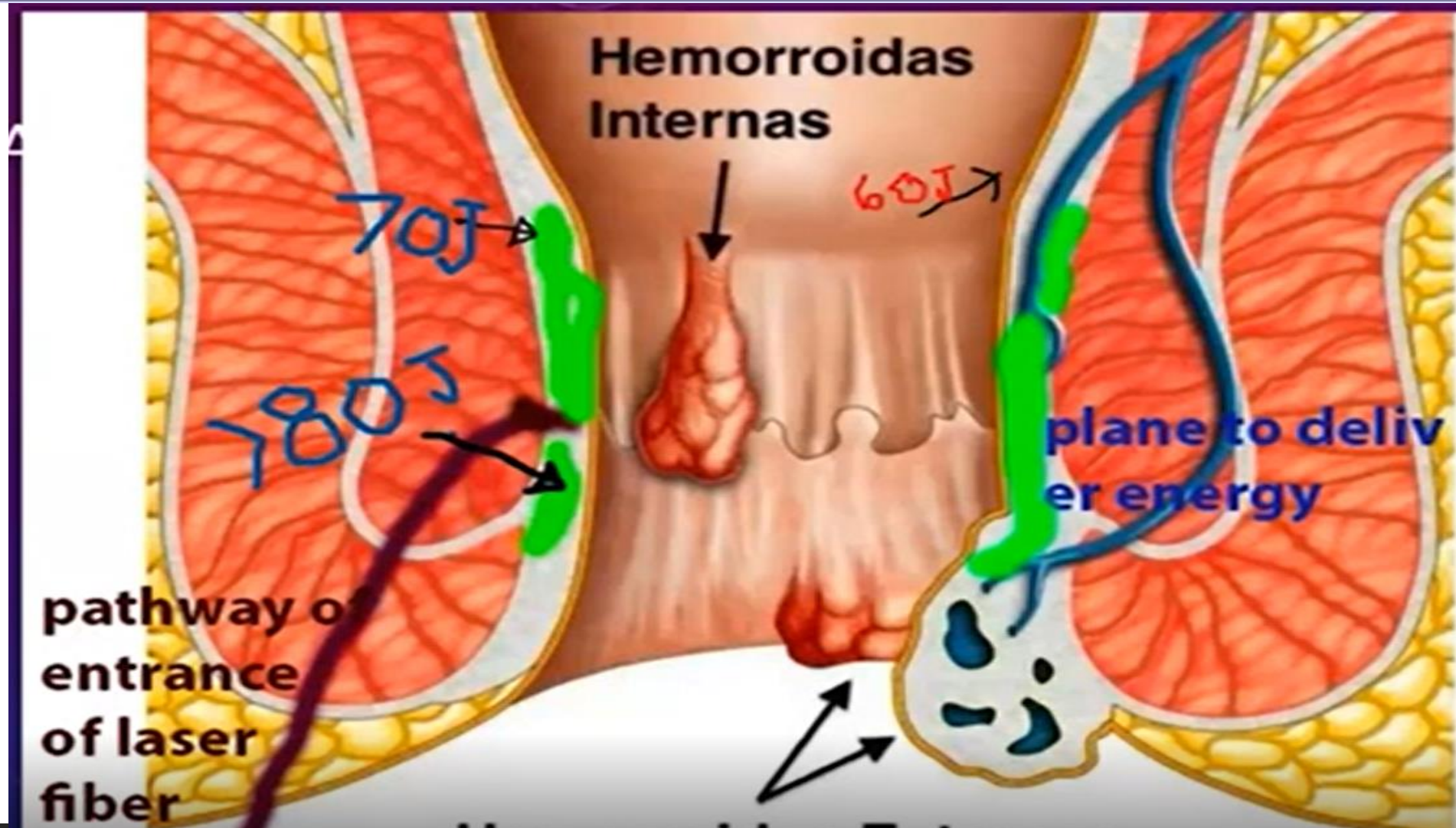
- Light turns into localized heat
- Thermal damage of 1-2mm
- Optimal degree of water absorption in the tissue, emits energy at the wavelength of 1470 nm.
- The wavelength has a high degree of water absorption in the tissue, and 980 nm provides high absorption in hemoglobin.
- The bio-physical property of the wave used in laser means that the ablation zone is shallow and controlled, and therefore there is no risk of damage to adjacent tissues. Additionally, it has a very good effect on blood (no risk of bleeding).



STEPS

- A. 60 JOULE-INTRALUMINAL WITHOUT TOUCHING
- B. 70 JOULE-SUBMUCOSA PLANE
- C. 80 JOULE PLUS- INTRAHEMORROIDAL

MACHINE AT 8 WATT SETTING



STEP-A : 60 JOULES@ 8 W

STEP B - 70J @8 W

STEP C - 80+J @ 8W

PROBLEMS DURING LASER SURGERY FOR HAEMORROIDS

1. FIBER BROKEN INSIDE

- WHEN IT IS TOO LONG

2. BLEEDING

- MUCOSA
- SKIN
- HAEMATOMA INSIDE

COMPLICATIONS

IMMEDIATE

1. BLEEDING
2. BURN

DELAYED

1. BLEEDING
2. INFECTION
3. ABCESS

CAN I COMBINE OTHER TECHNIQUES



POST STAPPLED HAEMORROPEXY



Role of adding mucopexy after LASER

1. If there is associated mucosal prolapse
2. Big third degree with redundant external haemorrhoidal disease
3. Fourth degree haemorrhoidal disease

When LASER should not done



Why people prefer undergoing laser treatment

☐ Less Painful

Laser treatment is one of the least painful surgical treatments for piles. However, Laser surgery does not create any type of sparks, steam, or smoke. This makes the surgery safe.

☐ Less Bleeding

Less bleeding is another great advantage of laser surgery. The **laser hemorrhoids surgery** helps in minimizing the amount of blood flow by blocking the blood vessels and tissues. This surgery does not affect the tissues around the hemorrhoid in any way.

☐ Quick Treatment

Another **pros of laser treatment** for piles is that the duration of laser surgical treatment is very less. In most cases, the surgery takes about 45 minutes to complete. Some alternative methods might take the duration between a few days to a few weeks to completely heal. This makes laser surgery a better choice.

why people prefer undergoing laser treatment of piles includes

☐ Quick Discharge

Doubtlessly, staying in the hospital for too long is not an enjoyable experience. the patient is discharged within an hour after the completion of the surgery. This minimizes the cost of staying overnight at the hospital too.

☐ Quick Healing

Patients can proceed with their regular routine with a minimum of two days of rest. Though a patient is allowed to get back home within an hour after the surgery, resting for a little time is required for complete healing of the surgery. Anyhow, the duration required for the healing process is way far lesser.

☐ Easy to Conduct

Carrying laser surgery is way easier than conducting regular surgery. This is because the surgeon has much more control over the procedure. The amount of effort that the surgeon needs to put in the laser hemorrhoids surgery is a lot lesser.

Cons of Laser Treatment for Piles

☐ **Expensive Equipment**

The machines required to perform laser surgery is quite expensive. This makes it difficult for many clinics and hospitals to install it. Due to this, finding the appropriate clinic becomes tough.

☐ **May Cause Fire**

There have been rare cases in which the laser surgical equipment caught fire while performing the laser hemorrhoids surgery. Usually, this does not happen. Anyhow, it can take place because of the manufacturing defect, or in case the equipment is not maintained properly or operated safely. It is natural to damage the equipment if people don't know how to use it cautiously.

☐ **Some reports suggest higher recurrence rate** than conventional surgery

☐ **Associated with LASER burn**

Review of Important literature on Hemorrhoidal LASER procedure

LASER Hemorrhoidoplasty Short- and long-term outcomes (Clinical trial 2019)

- Although laser haemorrhoidoplasty achieves a high short-term success rate with respect to stage reduction and symptom improvement
- it is associated with
 - a high rate of minor postoperative complications and
 - long-term recurrence
- Therefore, laser haemorrhoidoplasty should be used with caution.

Short- and long-term outcomes of laser haemorrhoidoplasty for grade II-III haemorrhoidal disease
Colorectal Dis 2019 Jun;21(6):689-696. doi: 10.1111/codi.14572. Epub 2019 Feb 20.
S Faes 1 2, M Pratsinis 1 3, S Hasler-Gehrer 1, A Keerl 1, A Nocito 1

LASER Hemorroidoplasty postoperative discomfort and pain in the management of hemorrhoidal disease (Clinical trial 2020)

- LASER hemorroidoplasty resulting negligible postoperative discomfort
- LHP could be considered a painless and minimal invasive technique in the treatment of HD.

Postoperative discomfort and pain in the management of hemorrhoidal disease: laser hemorroidoplasty, a minimal invasive treatment of symptomatic hemorrhoids

Updates Surg 2020 Sep;72(3):851-857. doi: 10.1007/s13304-019-00694-5. Epub 2019 Nov 23.

Luigi Brusciano 1, Claudio Gambardella 1 2, Gianmattia Terracciano 1, Giorgia Gualtieri 1, Michele Schiano di Visconte 3, Salvatore Tolone 1, Gianmattia Del Genio 1, Ludovico Docimo 4

Hemorrhoid laser procedure for second- and third-degree hemorrhoids: results from a multicenter prospective study(Clinical trial 2022)

This multicenter study has shown that the HeLP procedure for patients with second- and third-degree hemorrhoids is effective, is associated with a short operative and recovery time

can be carried out in a day surgery setting with minor intra- and postoperative pain, and provides a significant improvement in symptoms.

The initial results are maintained in the long term; therefore, this procedure could be regarded as an alternative to more invasive interventions in early-stage HD.

Hemorrhoid laser procedure for second- and third-degree hemorrhoids: results from a multicenter prospective study .[Tech Coloproctol 2022](#) DOI 10.1007/s10151-016-1479-6 P. De Nardi¹ A. M. Tamburini¹ P. G. Gazzetta¹ M. Lemma¹ A. Pascariello² C. R. Asteria³

LASER Hemoroidoplasty compared with Rubber band (RCT 2011)

- ❑ Despite higher cost
- ❑ the hemorrhoid laser procedure technique was more effective than rubber band ligation in
 - ❑ reducing postoperative pain,
 - ❑ resolving symptoms, and
 - ❑ improving quality of life in patients with grade II or III hemorrhoids with incomplete mucosal prolapse.

The hemorrhoid laser procedure technique vs rubber band ligation: a randomized trial comparing 2 mini-invasive treatments for second- and third-degree hemorrhoids

Randomized Controlled Trial Dis Colon Rectum 2011 Jun;54(6):693-8. doi: 10.1007/DCR.0b013e3182112d58.

Paolo Giamundo 1, Raffaele Salfi, Maria Geraci, Livio Tibaldi, Luisa Murru, Marco Valente

Laser Hemorrhoidoplasty Procedure vs Open Surgical Hemorrhoidectomy (Clinical trial 2014)

- ❑ laser hemorrhoidoplasty procedure is more preferred in comparison with conventional open surgical hemorrhoidectomy.
- ❑ Postoperative pain is significantly lesser in laser procedure compared with surgical procedure

Laser Hemorrhoidoplasty Procedure vs Open Surgical Hemorrhoidectomy: a Trial Comparing 2 Treatments for Hemorrhoids of Third and Fourth Degree [Acta Inform Med.](#) 2014 Dec; 22(6): 365–367. [Halit Maluku](#),¹ [Zaim Gashi](#),² [Ranko Lazovic](#),³ [Hilmi Islami](#),⁴ and [Argjira Juniku-Shkololli](#)²

laser hemorrhoidoplasty compared with sutured mucopexy and excisional hemorrhoidectomy (RCT 2020)

- ❑ Laser hemorrhoidoplasty is a safe, minimally invasive option for hemorrhoids
- ❑ more effective than Mucopexy
- ❑ less effective than Excisional hemorrhoidectomy
- ❑ Patients evaluate this technique better than the other two.

Results of the double-blind randomized controlled trial comparing laser hemorrhoidoplasty with sutured mucopexy and excisional hemorrhoidectomy

Randomized Controlled Trial Int J Colorectal Dis 2020 Mar;35(3):481-490. doi: 10.1007/s00384-019-03460-6. Epub 2020 Jan 8.

Tomas Poskus 1 2, Donatas Danys 3 4, Gabija Makunaite 3, Antanas Mainelis 4 5, Saulius Mikalauskas 3 4, Eligijus Poskus 3 4, Valdemaras Jotautas 3 4, Audrius Dulskas 6, Eugenijus Jasiunas 4, Kestutis Strupas 3 4

LASER Hemoroidoplasty versus Conventional Open Haemorrhoidectomy in the Treatment of Symptomatic Haemorrhoids: A Randomized Controlled Trial 2020

Results from this trial may demonstrate the superiority of LAH over COH in terms of post-operative pain and recovery

This would likely increase the adoption of LAH for the treatment of symptomatic haemorrhoids

Study Protocol for the Use of Conventional Open Haemorrhoidectomy versus Laser Haemorrhoidoplasty in the Treatment of Symptomatic Haemorrhoids: A Randomized Controlled Trial

Comparative Study *Eur Surg Res* 2020;61(6):201-208. doi: 10.1159/000513844. Epub 2021 Feb 25.

Frederick H Koh 1, Fung Joon Foo 2, Leonard Ho 2, Sharmini S Sivarajah 2, Winson J Tan 2, Min-Hoe Chew 2

LASER Hemoroidoplasty Clinical Outcomes and Effectiveness : A Systematic Review 2021

- ❑ Laser treatment had acceptable clinical outcomes for grade 2 and 3 hemorrhoids
- ❑ lower rates of postoperative pain and bleeding
- ❑ satisfactory long-term outcomes.

Clinical Outcomes and Effectiveness of Laser Treatment for Hemorrhoids: A Systematic Review

[World J Surg](#) .2021 Apr;45(4):1222-1236.

doi: 10.1007/s00268-020-05923-2. Epub 2021 Jan 19.

[Kasun Lakmal](#)¹, [Oshan Basnayake](#)¹, [Umesh Jayarajah](#)¹, [Dharmabandhu N Samarasekera](#)²

Non-excisional laser therapies for hemorrhoidal disease: a systematic review of the literature (2020)

- ❑ LH showed conflicting results with one randomized controlled trial reporting similar recurrence rate, but another reporting decreased recurrences associated with hemorrhoidectomy.
- ❑ Laser therapies showed lower postoperative pain than hemorrhoidectomy or rubber band ligation.
- ❑ LH and HeLP are safe and effective techniques for the treatment of grades II and III HD

Non-excisional laser therapies for hemorrhoidal disease: a systematic review of the literature
Gregoire Longchamp, Emilie Liot, Jeremy Meyer, Christian Toso, Nicolas C. Buchs & Frederic Ris
[Lasers in Medical Science Review Article September 2020](#) volume 36, pages485–496 (2021)

LASER haemorrhoidoplasty versus Milligan-Morgan haemorrhoidectomy for symptomatic haemorrhoids (Systematic review and meta-analysis 2022)

This systematic review revealed a paucity of well-conducted, large RCTs comparing CoH and LHP that measure symptom recurrence as a primary outcome and a minimum follow-up period of 24 months.

- Our findings suggest that LHP provides benefits firstly to patients through reduced intraoperative blood loss, substantial reduction of postoperative pain up till the first postoperative month, reduced risk of most postoperative short- and moderate-term complications and improved postoperative QoL; and secondly to providers by reducing operative time.
- Crucially, the moderate-term recurrence rate is equivalent to CoH. Our findings contribute to the pool of evolving data regarding contemporary surgical treatments for HD. In addition, cost-utility data in a robust health economics study is needed
- The total cohort from all included studies was 1824 patients. The mean duration of follow-up was 8.58 ± 9.55 months

Systematic review and meta-analysis of postoperative pain and symptoms control following laser haemorrhoidoplasty versus Milligan-Morgan haemorrhoidectomy for symptomatic haemorrhoids: a new standard *International Journal of Colorectal Disease* (2022) 37:1759–1771 <https://doi.org/10.1007/s00384-022-04225-4>

Varen Zhi Zheng Tan¹ · Ern-wei Peck¹ · Sharmini S. Sivarajah² · Winson J. Tan² · Leonard M. L. Ho² · Jia-Lin Ng² · Cheryl Chong² · Darius Aw² · Franky Mainza³ · Fung-Joon Foo² · Frederick H. Koh

The image depicts a vibrant, stylized scene of an ancient Egyptian temple's interior. Two large, powerful waterfalls cascade down from the top of the frame, where they are held back by massive, dark brown stone blocks. The water is a bright, clear blue, creating a sense of freshness and movement. The floor is composed of large, light-colored stone tiles, each featuring intricate circular and geometric patterns. Small green plants and moss are growing between the tiles, adding a touch of nature to the ancient setting. In the background, through the opening of the temple, a bright blue sky with a few white clouds is visible. On the horizon, several pyramids and other ancient structures are silhouetted against the sky. The overall style is reminiscent of a classic video game or a digital illustration, with bold colors and clear lines.

Thank you