

## ORIGINAL RESEARCH—EJACULATORY DISORDERS

# The Role of Short Frenulum and the Effects of Frenulectomy on Premature Ejaculation

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### ABSTRACT

**Introduction.** The role of short frenulum and the effects of frenulectomy on premature ejaculation (PE) were never investigated.

**Aims.** The aims of this study were to evaluate the prevalence of short frenulum in a population of patients affected by lifelong PE and to investigate the role of frenulectomy as first-line treatment for this condition.

**Methods.** We performed frenulectomy to patients complaining of lifelong PE in which we found the presence of a short frenulum at physical examination. We evaluated intravaginal ejaculatory latency time (IELT) and the score of a validated PE questionnaire at baseline and after frenulectomy.

**Main Outcome Measures.** We evaluated the change in mean IELT and in mean PE questionnaire score.

**Results.** We found the presence of a short frenulum in 59 out of 137 (43%) subjects who came to our center complaining of lifelong PE. Mean age of study population was 38.2 years ( $\pm 5.3$  standard deviation). At baseline period, mean IELT was 1.65 minutes ( $\pm 1.15$ ), and mean PE questionnaire score was 15.8 ( $\pm 2.85$ ). No complications related to surgery occurred. Mean follow-up time was 7.3 months ( $\pm 3.18$ ). After frenulectomy, mean IELT was 4.11 minutes ( $\pm 1.77$ ), and mean PE questionnaire score was 9.85 ( $\pm 3.2$ ). An increase in mean IELT of 2.46 minutes ( $P < 0.0001$ ) and a reduction in mean PE questionnaire symptoms score of 5.95 ( $P < 0.0001$ ) were noted.

**Conclusion.** Short frenulum is a genital anomaly found in 43% of individuals affected by lifelong PE in our data set. We suggest always ruling out at physical examination the presence of a short frenulum in all patients complaining of PE and to propose frenulectomy as first-line treatment in these cases. **Gallo L, Perdonà S, and Gallo A. The role of short frenulum and the effects of frenulectomy on premature ejaculation. J Sex Med 2010;7:1269–1276.**

**Key Words.** Lifelong Premature Ejaculation; Frenulum; Frenulectomy; Frenuloplasty; IELT; PE Questionnaire

### Introduction

Premature ejaculation (PE) is likely the most common sexual dysfunction in men [1]. PE was recently defined by the International Society of Sexual Medicine as “a male sexual dysfunction characterized by ejaculation which always or nearly always occurs prior to or within about one minute of vaginal penetration, and the inability to delay ejaculation on all or nearly all vaginal penetrations, and negative personal consequences, such as distress, bother, frustration and/or the avoidance of sexual intimacy” [2].

Since 1887, when Gross described the first case of “rapid ejaculation,” hundreds of articles were published about this topic [3]. In spite of this fact, the etiology of this very common male sexual problem was not yet completely understood. There are some physical or organic conditions such as prostatitis that were found to be involved in PE [4]. Particularly, along the history of approach and treatment of PE, there was always the suspect inside the urological community that short frenulum would have been a risk factor and a predisposing condition for PE [5]. Nevertheless, surprisingly, during this time, the role of short

frenulum in the etiology of PE, its prevalence in patients with PE, and the effectiveness of frenulectomy as a potential therapy for this class of patients were never investigated.

### Aims

The objectives of the present study were to evaluate the prevalence of short frenulum in a population of patients coming to our center seeking therapy for lifelong PE and to investigate the role of frenulectomy for treatment of this condition in these patients.

### Methods

From January to December 2008, all patients coming to our center seeking treatment for lifelong PE underwent a meticulous medical and sexual history, and a physical examination. The diagnosis of PE was based according to the International Society of Sexual Medicine definition criteria [2]. In our study, we enrolled patients complaining of lifelong PE in which we found the presence of a short frenulum at physical examination and who accepted to undergo frenulectomy as first-line treatment for this condition. We considered as a “short frenulum” every case in which, applying a gentle pressure, the length of the frenulum restricted the movement of the prepuce, causing, during its complete retraction, a ventral curvature of the glans major of 20°. The same physician examined all patients (L.G.). All patients signed an informed consent form before being included in our protocol. Patients were not allowed to enter our study if any of the following exclusion criteria were present: genital infection; depression and neurological disorder; erectile dysfunction (ED), defined as a score from the 5-item version of the International Index of Erectile Function (IIEF-5) minor of 21; concomitant presence of a phimosis; current history of alcohol or drug abuse; use of tricyclic antidepressants, monoamine oxidase inhibitors, or selective serotonin reuptake inhibitors (SSRIs); and an unstable relationship [6]. Couples considered eligible for inclusion underwent a baseline evaluation period of 1 month during which they were asked to have at least three sexual intercourses, separated by an interval of 24 hours, and to record the intravaginal ejaculatory latency time (IELT) in a diary card provided. To measure IELT, each patient was provided with a stopwatch and instructed that he, or his partner, should time his IELT for each sexual

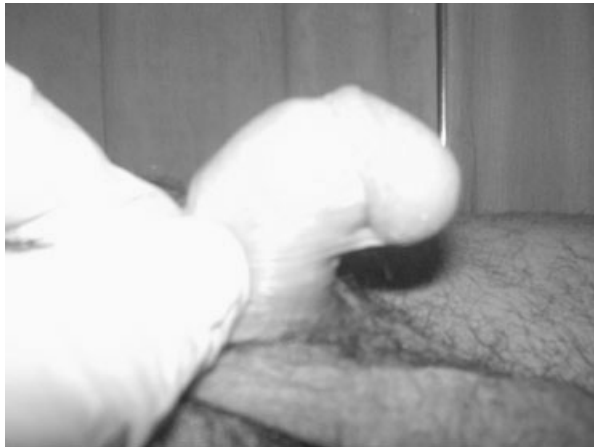
encounter, by starting timing at vaginal penetration and stopping timing at the start of ejaculation. The baseline IELT for each subject was calculated as the arithmetic mean IELT of all attempts during the first month.

At the end of the baseline period, patients completed the self-administered 5-item questionnaire validated by Symonds and co-workers, translated and adapted by the author in Italian [7]. This clinical tool explores all the domains at the basis of diagnosis of PE: lack of ejaculatory control, decreased satisfaction with sexual intercourse, intrapersonal distress, and negative impact on quality of life. From the answer to this questionnaire, the resulting score ranged from 0 for normal subjects to 20 for very severe PE. Basing on the score of PE diagnostic tool (PEDT), study population was classified as presence of PE (score > 10), absence of PE (score < 9), and high risk of PE (score 9 and 10).

After this baseline period necessary for patient evaluation, frenulectomy surgery was scheduled. The procedure was performed using a lidocaine-prilocaine anesthetic cream spread on the frenulum area 1 hour before intervention. If needed, a further dose of 2% lidocaine was injected at level of frenulum. Taking care to avoid any injuries to the urethra, a deep Vycril 2/0 (Ethicon; Somerville, New Jersey, USA) stitch was passed at the basis of the frenulum including the frenular artery and nerve in order to prevent bleeding and to provide suspension of the penis. The proximal stump of the frenulum was coagulated using monopolar current. Then, using iris scissors, a perpendicular incision of the midportion of the frenulum was performed. By moving scissors in a plane parallel to the penile shaft, a total frenulectomy was executed. The frenuloplasty was finally performed by separated stitches of fast absorbable Vycril 4/0 sutures positioned at very close distances (Figures 1–3). We prescribed 5 days of oral quinolones after surgery.

Patients were not allowed to have sexual intercourses during the 2 weeks after surgery, and then they were permitted recording IELT as previously described.

A screening visit was scheduled every 3 months since surgery. At each visit, every patient filled again the PEDT and showed the diary card in which the IELT for each sexual intercourse attended was recorded. To calculate our results, we considered for each subject enrolled in our study the arithmetic mean value of all PEDT scores resulting from each follow-up visit and the arithmetic mean value of all IELT measurements.



**Figure 1** Presence of a short frenulum at physical examination.

### Main Outcome Measures

The main outcome measures were the change in mean IELT and in mean PE questionnaire score, before and after treatment. For this purpose, we executed a *t*-test for statistical analysis using Microsoft Excel®.

### Results

From January to December 2008, 137 patients came to our center complaining of lifelong PE. Mean age was 35.3 years ( $\pm 8$  standard deviation [SD]). Among these patients, according to our diagnostic criteria, we found the presence of a short frenulum at physical examination in 59 out of 137 (43%). Fourteen patients were excluded



**Figure 2** Image of the ventral aspect of the penis after frenulectomy.



**Figure 3** Six months after surgery.

from the study: seven of them did not have a stable sexual partner, two had ED (IIEF-5 < 21), two had genital infection, two had a concomitant phimosis and one was excluded for a recent history of alcohol abuse. Among the remaining 45 patients, 40 accepted to be enrolled in our study. Mean age of study population was 38.2 years ( $\pm 5.3$  SD).

At baseline period, mean IELT was 1.65 minutes ( $\pm 1.15$  SD), and mean PE questionnaire symptoms score was 15.8 ( $\pm 2.85$  SD). Basing on the PEDT score, 38 patients (95%) were PE (score > 10) and 2 (5%) were high-risk PE (score 9 or 10).

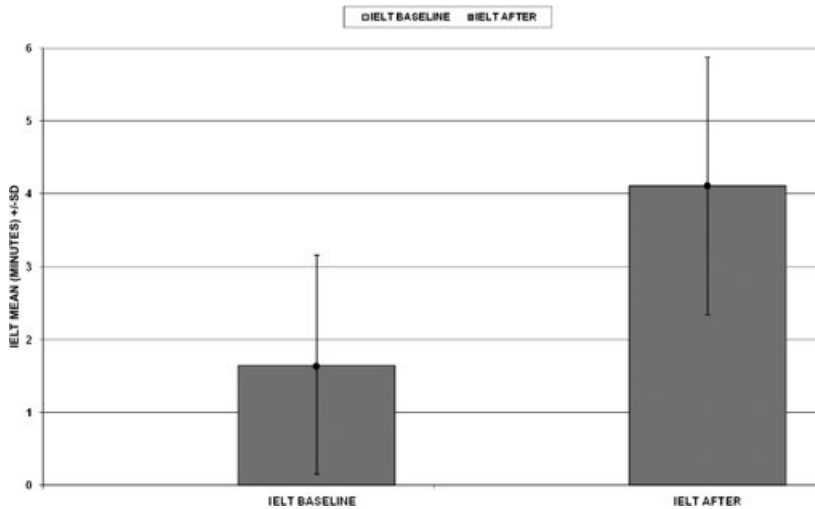
At surgery, in 29 cases (72.5%), a lidocaine–prilocaine anesthetic cream alone was effective to provide local anesthesia. In 11 cases (27.5%), a further injection of 5 mL of 2% lidocaine was required. We reported no complications related to surgery.

Mean follow-up time was 7.3 months ( $\pm 3.18$  SD). After frenulectomy, mean IELT was 4.11 minutes ( $\pm 1.77$  SD), and mean PE questionnaire score was 9.85 ( $\pm 3.2$  SD). There was an increase in mean IELT of 2.46 minutes ( $P < 0.0001$ ) and a reduction in mean PE questionnaire symptoms score of 5.95 ( $P < 0.0001$ ) (Figures 4 and 5).

### Discussion

#### Definition and Diagnosis of PE

PE was recently defined by the International Society of Sexual Medicine as “a male sexual dysfunction characterized by ejaculation which always or nearly always occurs prior to or within about one minute of vaginal penetration, and the inability to delay ejaculation on all or nearly all vaginal



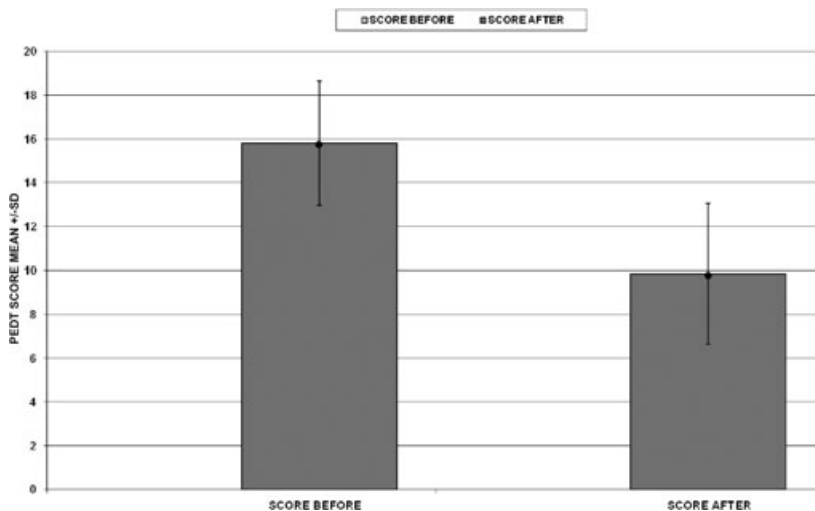
**Figure 4** Change in mean intravaginal ejaculatory latency time (IELT) (minutes) after treatment. SD = standard deviation.

penetrations, and negative personal consequences, such as distress, bother, frustration and/or the avoidance of sexual intimacy” [2]. Although the diagnosis of PE is simple in clinical practice, basing on the elements of this definition, the evaluation of PE in clinical trials is often problematic. The IELT, defined as the time between vaginal intromission and intravaginal ejaculation, is the most common diagnostic tool used in clinical trials to assess PE [8]. Its major advantage is to provide the most objective and quantitative method to establish the severity and the treatment response of PE in clinical studies. However, data from some studies show that the use of IELT alone is insufficient for evaluating patients with PE because it does not reflect important subjective components of this multidimensional condition, such as control over ejaculation and distress [9,10].

Hence, a precise evaluation of PE, able to quantify the subjective components related to this condition, requires a patient-reported outcome. For this reason, in order to evaluate the subjective components expressed by the patients, we used, in conjunction with the objective measurement provided by IELT, the self-administered 5-item questionnaire validated by Symonds and co-workers [7]. This clinical tool, translated and adapted by the author in Italian, explores all the domains at the basis of diagnosis of PE: lack of ejaculatory control, decreased satisfaction with sexual intercourse, intrapersonal distress and negative impact on quality of life.

#### *Etiology of PE*

The pathophysiology of ejaculation has yet to be fully delineated, and might include a combination



**Figure 5** Change in mean premature ejaculation diagnostic tool (PEDT) score after treatment. SD = standard deviation.

of organic and psychogenic factors [11]. A number of theories have been proposed regarding the causes of PE, but the two most likely are penile hypersensitivity and serotonin receptor sensitivity [12]. In particular, regarding the first theory, Xin and associates reported that men with PE have lower biothesiometric vibration perception thresholds and significantly shorter mean somatosensory evoked potential latency times of the glans and penile shaft than controls [13,14]. These results suggest that men with PE have a greater cortical representation of sensory stimuli from the glans penis than do normal controls.

Furthermore, some physical conditions such as genital anomalies or prostate inflammation can predispose to this dysfunction. Prostatitis has been found with high frequency in patients with PE, suggesting a role for prostatic inflammations in the pathogenesis of some cases of PE [4].

#### *Limitations of Current Therapies for PE*

Basing on the main theories about the pathophysiology of PE, penile hypersensitivity and serotonin receptor sensitivity, actually, the most prescribed medications for this condition are topical anesthetics and SSRIs [15]. Even if these kinds of drugs were both found to be effective for this purpose, they present many limitations. First, they are off-label drugs: they have no specific indications for PE. Second, they both present adverse reactions. Topical anesthetics can cause loss of penile sensation, retarded ejaculation, penile irritation, ED, and decreased vaginal sensitivity in the female [16].

SSRIs can determine psychiatric and neurological consequences, dermatological reactions, anticholinergic side effects, changes in body weight, cognitive impairment, drug–drug interactions, and sexual side effects other than delayed ejaculation (e.g., ED and loss of libido) [17]. Many authors consider adverse reactions caused by SSRIs questionable or not justified relating to the therapy of a not life-threatening condition as PE [18].

Dapoxetine, the last drug developed for PE treatment, has shown to have a better profile, however, even its assumption is not free of adverse reactions such as nausea, diarrhea, dizziness, and headache [19]. Finally, topical anesthetics and SSRIs are both symptomatic agents: they are not a definitive treatment, and their discontinuation leads to the status quo ante.

#### *Does a Potential Definitive Treatment for PE Exist?*

Mulhall affirmed that “the ideal drug for PE should be an on-demand-dosed treatment with a

high rate of efficacy and a short onset of action, should not interfere with sexual spontaneity, and should not have sexual side effects” [20]. Similarly, Hellstrom proposed that “considering that the frequency of sexual intercourse is highly variable, and spontaneity in sexual intercourse is usually an important factor, the ideal treatment for PE would be a discrete and ‘on-demand’ therapy with rapid action, effective from the first dose and with high efficacy on IELT and patient-reported outcomes, a low incidence of side-effects, and have no unwanted effects on the partner” [21].

After many years in which it was long discussed about the best treatment for PE we can wonder: “Does a potential definitive treatment, able to free patients from the slavery of the on demand assumption, exist?”

Two kinds of surgical treatment were proposed with this objective: circumcision and penile dorsal neurotomy.

The effects of circumcision on male sexuality are very controversial. There are few studies about this topic, which often present limitations. Senol et al. concluded that circumcision may contribute to sexual satisfaction by prolonging pudendal evoked potentials latency [22]. Zhang and co-workers, studying the effects of redundant prepuce on PE, found circumcision an effective method to treat PE [23]. Using the Brief Male Sexual Function Inventory (BMSFI) questionnaire to assess sexual performance, Senkul et al. affirmed that adult circumcision does not adversely affect sexual function and that the increase in the ejaculatory latency time can be considered an advantage rather than a complication [24].

In spite of the results of these studies, the most part of authors remains skeptical and very critical about circumcision outside its proper indication for phimosis. Collins et al. demonstrated no statistically significant changes in any of the BMSFI parameters of male sexual function after circumcision [25]. Paradoxically, Zwang proposed that circumcision, denuding the penis and fully exposing the very sensitive area of the corona to direct stimulation, can cause a greater incidence of PE [26]. O’Hara and O’Hara carried out a survey of women’s preferences for the circumcised or intact penis in their male partners. The women reported that their circumcised male partners were more likely to have PE than were intact partners [27]. Kim and Pang, using the BMSFI questionnaire to study the effects of circumcision on male sexual functions, found no statistically significant differences in sexual drive, erection and ejaculation

between circumcised and uncircumcised men. There was a slightly longer IELT in uncircumcised men than in circumcised men, even if this difference was not significant. Furthermore, circumcised men reported decreased masturbatory pleasure and sexual enjoyment. Authors concluded that adult circumcision adversely affects sexual function in a significant number of men, possibly because of loss of nerve endings. In addition, 9% of the circumcised men reported severe scarring of their penises [28].

Regarding neurotomy of the dorsal nerves of the penis, this is a drastic approach to provide desensitization. This invasive and irreversible measure is reported to be effective, but has failed to gain wide support in the medical community [29,30].

#### *Role of the Short Frenulum and Effects of Frenulectomy on PE*

Since 1887, when Gross described the first case of “rapid ejaculation,” there was always the suspect inside the urological community that short frenulum would have been a risk factor and a predisposing condition for PE [3]. Waldinger distinguished four periods in the approach and treatment of PE. During the second of this four periods (1917–1950), “some physicians stated that PE was a result of anatomical urological abnormalities, e.g., too short a foreskin frenulum, which had to be treated with incision” [5]. Therefore, the theory of the frenulum breve is very old, dating back as far as 1917. In our revision of literature, we found just two articles in which the short frenulum was classified as a possible cause of PE, however, none of them based this affirmation on scientific pieces of evidence [31,32]. To our knowledge, this is the first prospective study evaluating the role of short frenulum in the etiology of PE and its prevalence in patients affected by this condition.

Short frenulum, also defined as frenulum breve, is a common genital anomaly depending on a defect during sexual development: typically, subjects affected by this condition failed to uncover completely the prepuce. Furthermore, a short frenulum can even depend on an excessive scarring after the rupture of a normal frenulum. This condition restricts the complete retraction of the prepuce in the erection status, causing a ventral curvature of the glans.

A short frenulum can present in various grades of severity, and its finding may depend on the subjective criteria of evaluation at physical examination. We did not find any definition of this con-

dition in medical literature. In our series, we arbitrarily defined a “short frenulum” every case in which, applying a gentle pressure, the length of the frenulum restricted the movement of the prepuce, causing, during its complete retraction, a ventral curvature of the glans major of 20°.

In the absence of a more definitive and selective study about the physiological mechanism of frenulum breve on PE, we can assume that this genital anomaly essentially affects ejaculation in two ways. First, it causes discomfort and a bothering sense of traction during sexual intercourse, stimulating the anticipation of the end of the coitus. Second, as showed by Halata and Munger, in conjunction with glans corona, the frenulum is the most sensitive zone of the penis [33]. The short frenulum is an authentic reservoir of neural endings directly exposed to tactile stimulation during sexual intercourse. These two mechanisms can be a rational and a likely explication of the implication of short frenulum in PE, however, they were not evaluated specifically in the present study.

In our series, according to our diagnostic criteria, we found a very high prevalence of short frenulum in patients seeking treatment for lifelong PE coming in our center: almost half (43%) of our study population was affected by this genital anomaly. We proposed to all these patients frenulectomy as first-line treatment for PE. We slightly modified the usual technique for frenulum lengthening. We performed a total excision of the frenulum basing on the principle that this is a very sensitive zone of the penis rich of neural endings [33]. Furthermore, in order to provide a total denervation of this area, the proximal stump of the frenulum was coagulated using monopolar current. Our objective was to surgically provide a total and permanent denervation of the frenulum area.

After the treatment, we found an increase in mean IELT of 2.46 minutes ( $P=0.003$ ) and a reduction in mean PE questionnaire symptoms score of 5.95 ( $P<0.0001$ ). In our series, just three patients reported no improvements.

As showed by Yang and Bradley, the frenulum receives its proper innervation by a branch of the perineal nerve, whereas the rest of the glans is innervated by the dorsal nerve afferents to the pudendal nerves [34]. Therefore, our surgical procedure did not interfere with the rest of the glans innervation, causing minimal lesion to penile sensitivity. Differently from circumcision and dorsal neurotomy, frenulectomy does not cause loss of nerve endings and damages on glans penile sensi-

tivity. Practically, our procedure just acts on the impaired ventral sensitivity affected by the presence of a frenulum breve without causing any lesion to the dorsal component. Furthermore, the complete removal of the frenulum allows the complete extension of the penis at erection.

Frenulectomy is a minimal invasive, easy to perform, safe and economic procedure that does not affect the main glans sensitivity. It requires a few minutes of surgical time, and it is performed in most cases simply with a local cream anesthesia with minimal discomfort for the patient.

We admit that the present study may present some limitations, such as the absence of a control group and the difficulty to define a "short frenulum." However, basing on our results, we strongly suggest to always rule out at physical examination the presence of a frenulum breve in all patients complaining of PE and to propose frenulectomy as first-line treatment in these cases.

During a historical period in which pharmaceutical interests tend to promote medical approach with SSRIs such as dapoxetine as first-line treatment for PE, our voice could sound as out of the chorus. However, we want to simply emphasize the fact that an accurate clinical examination still remains a cornerstone of medicine and that the abolition of risk factors and of predisposing conditions is the first step of any treatment.

For the future we encourage new studies evaluating this specific topic to assess biothesiometric vibration threshold and somatosensory evoked potential latency times specifically on the frenulum area. Unfortunately, these kinds of diagnostic tools were not available in our center at the time of writing of this article. Furthermore, the effectiveness of frenulectomy even in patients with a normal frenulum complaining of PE could be a very interesting and promising argument of evaluation.

### Conclusions

In this study, we found the presence of a short frenulum in 43% of individuals coming to our center complaining of PE. After frenulectomy, we reported an increase in mean IELT of 2.46 minutes ( $P < 0.0001$ ) and a reduction in mean PE questionnaire symptoms score of 5.95 ( $P < 0.0001$ ). Basing on the findings of the present study, we strongly suggest to always rule out at physical examination the presence of a short frenulum in all patients complaining of PE and to propose frenulectomy as first-line treatment in these cases.

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*Conflict of Interest:* None.

### Statement of Authorship

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##### (a) Drafting the Article

Luigi Gallo; Sisto Perdonà; Antonio Gallo

##### (b) Revising It for Intellectual Content

Luigi Gallo; Sisto Perdonà; Antonio Gallo

#### Category 3

##### (a) Final Approval of the Completed Article

Luigi Gallo; Antonio Gallo

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