

## THE ULTRASONIC TREATMENT OF PEYRONIE'S DISEASE

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In 1743 Peyronie described a lesion of the penis he had observed while examining a 48-year-old patient.<sup>1</sup> An indurated area in the corpus cavernosum produced a marked bend of the penis with erection, which prevented normal intercourse and satisfactory ejaculation. There seemed to be no interference with the free passage of urine. In this case and in others he had seen, the bend occurred in the direction of the indurated region. He suspected a urethral or venereal etiology but the lesion or the bend did not respond to conventional therapy for these diseases. Peyronie discussed similar cases he had observed and noted that this was not an uncommon condition with advancing age.

More than 2 centuries have elapsed since Peyronie's report of the disease which bears his name. It also has been referred to as plastic induration of the penis, fibrous cavernositis, chronic cavernositis, primary indurative cavernositis, circumscribed fibrosis of the penis, fibrous sclerosis of the penis, fibrositis and induratio penis plastica. The lack of knowledge regarding etiology and pathophysiology has resulted in a variety of therapeutic regimens. Evaluation of treatment programs remains difficult since the results are necessarily subjective in nature.

Although more than 2,000 cases of Peyronie's disease have been reported in the literature, the true incidence of the disease is not known. Smith suggested that the subclinical form is more common than previously suspected.<sup>2</sup> He found 23 cases with histologic evidence of the process among 100 consecutive routine autopsies performed at Walter Reed General Hospital. Chronic

inflammation with evidence of fibrosis of the subtunical sheath and mild involvement of the areolar connective tissue sleeve was noted. The interesting finding of 7 cases of urethritis in the 23 patients with subclinical Peyronie's disease suggests recurrent urethritis, perhaps of a viral etiology, with spread of the inflammatory process to the subtunical location.

Herbut described the clinical form of the disease as consisting of solitary or multiple lesions confined to the tunics of the corpora cavernosa penis, the septum separating the corpora and Buck's fascia. The indurations are usually on the dorsum, less often lateral and readily palpable beneath the skin. Histologically, the plaques "are composed of compact, collagenous acellular fibrous tissue containing few elastic fibers". Vessels are few in number and few leukocytes are seen. Focal calcification, bone and even cartilage may be present in longstanding cases.<sup>3</sup>

The natural history of Peyronie's disease has been studied by Williams.<sup>4</sup> He stated that the process is fully manifested when the patient is first seen and the natural history is one of gradual resolution (without therapy). Of 21 patients followed, 6 had complete resolution, 10 showed improvement and 5 remained unchanged. The average period for resolution was 4 years. Williams suggested that this must be considered in evaluating any form of therapy.

This condition presents little problem in differential diagnosis. The readily palpable plaque or plaques are present on careful examination and this, in itself, may be the presenting finding. The possibility of a neoplasm may be raised and reassurance is required. Occasionally, some tenderness may be present in the region of induration. The remainder of the findings are subjective and require description by the patient. Chordee with erection is common with the bend usually upward when the lesion is on the dorsum of the penis.

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<sup>1</sup> Peyronie, F., de La: Sur quelques obstacles qui s'opposent à l'éjaculation naturelle de la semence. Mem. de l'acad. roy. de chir., p. 425, 1743.

<sup>2</sup> Smith, B. H.: Subclinical Peyronie's disease. Amer. J. Clin. Path., 52: 385, 1969.

<sup>3</sup> Herbut, P. A.: Urological Pathology. Philadelphia: Lea & Febiger, vol. 2, chap. 7, pp. 799-802, 1952.

<sup>4</sup> Williams, J. L. and Thomas, G. G.: The natural history of Peyronie's disease. J. Urol., 103: 75, 1970.

Lateral curvature may occur if the plaque predominantly involves one corpus. The chordee may produce pain with erection and difficulty with intromission during intercourse. Occasionally, the patient may be aware of poor filling of the distal portion of the penis with erection. As a result of these factors interfering with erection and normal intercourse, the patient is usually anxious and fearful that he is approaching the end of his sexually active years. These feelings must be taken into consideration since it is the patient's primary concern once he has been assured that he does not have a malignant disease.

If there is difficulty with urination it is not related to the disease and no case of malignant change has been described. Coexisting Dupuytren's palmar contracture has been described in approximately 10 per cent of cases and has been higher in some series,<sup>4-10</sup> suggesting a fibrous diathesis etiology. Relationship to other disease entities and deficiency conditions has been suggested but not adequately substantiated. In some instances calcification can be demonstrated on penile roentgenograms, and better localization of the lesion by cavernosography is possible.<sup>11, 12</sup> These studies offer little in the clinical management of the case.

Various modalities of therapy and combinations have been used in the management of this localized benign disease. This fact is not surprising in view of the many names acquired, lack of etiologic agent and subjective nature of the chief complaint. Some of the more commonly used regimens have included operation<sup>13, 14</sup> external

radiation,<sup>7, 15, 16</sup> radium plaque,<sup>17</sup> steroid injections into the lesion,<sup>8, 9, 18-20</sup> vitamin E,<sup>10</sup> ultraviolet therapy,<sup>17</sup> histamine iontophoresis,<sup>21</sup> steroid iontophoresis<sup>22</sup> and potassium para-aminobenzoate (potaba).<sup>23</sup> Improvement has been reported with each form of therapy but the predictability and consistency of results vary considerably.

Ultrasound has been used medically for more than 30 years, with its greatest application in diseases of bones, muscles, joints and nerves. The exact mechanism of action remains obscure but it is suggested that there is selective heating in the interfaces between tissues of different physical properties. Excess exposure at increased intensity can produce necrosis of living animal tissue. In a liquid environment cavitation can occur. Ultrasound also has been used with increasing frequency for diagnostic purposes.

Dugois cited a series of 20 cases of Peyronie's disease treated with ultrasound.<sup>24</sup> In his own 8-year experience, he found it to be highly successful and suggested a minimum of 20 treatments. The use of  $\alpha$ -chymotrypsin injections in conjunction with ultrasound seemed to hasten the response in a few cases evaluated. He was impressed with the number of patients who responded who had not improved with vitamin E therapy. Liakhovitskii treated 67 patients with ultrasound and noted decrease in symptoms in almost all patients after 3

plastic induration of the penis (Peyronie's disease). *Acta Chir. Scand.*, **113**: 45, 1957.

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to 5 treatments.<sup>25</sup> A course of 20 to 25 treatments resulted in absence or marked decrease in pain in 52 patients. Improvement in curvature and decrease in the size of the lesion were noted to a lesser degree. Similar encouraging results were noted by other investigators.<sup>26, 27</sup> No morbidity has been described from the proper application of ultrasound therapy.

Since 1959 ultrasound therapy has been used in symptomatic cases of Peyronie's disease. A plan of therapy has evolved which we believe is free of morbidity and results in a high percentage of improvement.

#### MATERIALS AND METHODS

One of the authors (WWS) has been interested in the use of ultrasonic therapy for Peyronie's disease. No urologist in this area had followed a specific therapeutic regimen for Peyronie's disease long enough to arrive at any conclusions regarding its relative merits. Therefore, it was agreed to refer patients who were symptomatic to a single physician for evaluation, therapy and long-term followup. Patients with plaques who were asymptomatic and had no interference with normal sexual activity were not considered. The initial visit consisted of a careful history and urogenital examination. A drawing was made, localizing the lesion or lesions and noting their size and other pertinent characteristics. Occasionally, penile roentgenograms were made to demonstrate calcifications. No cavernosograms were performed.

From 1959 to 1970, 25 patients with symptomatic Peyronie's disease were treated with ultrasound therapy at this hospital. The treatments were administered on consecutive days (except weekends) by a single therapist after the involved area was outlined by the urologist (WWS), who was in attendance for the first treatment to aid in proper localization. The Burdick ultrasonic therapy unit with a mineral oil coupling agent was used (fig. 1). The mobile metal head applicator was rotated gently over the lesion (fig. 2). The power was set at an intensity of 1.5 watts per

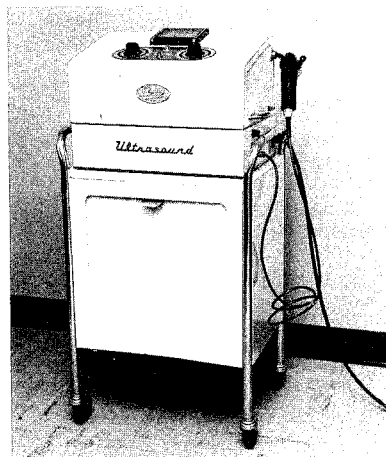


FIG. 1. Burdick ultrasound therapy unit

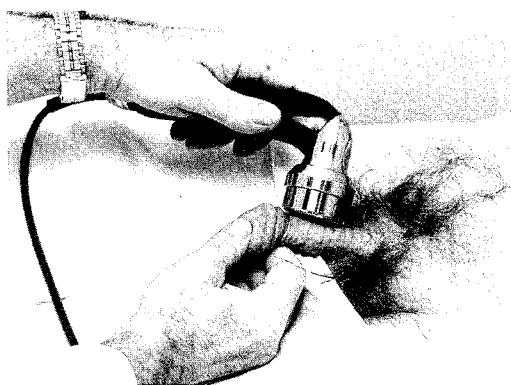


FIG. 2. Mobile metal head applicator with mineral oil coupling agent delivering ultrasonic therapy.

cm.<sup>2</sup> and the treatment period was limited to approximately 5 minutes. The number of treatments varied with the patient's response and repeat courses were administered when indicated. All patients were ambulatory and no complications were encountered. Local heat was noted by the therapist and the patient during treatment and rapidly disappeared with cessation of therapy.

Followup evaluations were done. Several patients returned for examination and interview in response to letters, even though they had been asymptomatic for long periods. Since response in many cases was subjective, a personal discussion with the patient was deemed essential for adequate appraisal of the results. A questionnaire or letter approach to followup might prove less reliable than an office evaluation when one is dealing with responses which relate to sexual performance.

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## RESULTS

The age distribution of the 25 patients varied from 33 to 76 years, with a mean of 53 years (table 1). As noted in other series, most patients (80 per cent) were between 40 and 60 years old. All patients had at least 1 plaque at the time of initial examination. In 4 patients lesions developed in new locations subsequent to the initial therapy program. Nine patients required repeat courses of ultrasonic therapy for residual symptoms, recurrence of symptoms or the formation of new lesions and associated problems.

TABLE 1. Age of 25 patients with Peyronie's disease at first visit

Age (yrs.)	Cases
	No. (%)
30-39	1 (4)
40-49	9 (36)
50-59	11 (44)
60-69	2 (8)
70-79	2 (8)
	—
	25

Dupuytren's contracture was present in 3 instances (approximating the 10 per cent figure previously noted by other investigators). In 1 case the palmar lesion also responded to ultrasound.

Vitamin E was administered orally in conjunction with ultrasonic therapy in earlier cases but was later abandoned. Patients who were on this therapy prior to ultrasound treatment were often taken off the tocopherol when the symptoms subsided. Only 1 patient had been treated previously with radiation therapy with no improvement and none had received steroids or the other forms of treatment previously cited.

Subjective improvement was noted in 23 of 25 patients (92 per cent). This was related to decrease in chordee, better filling with erection and more satisfactory intercourse with relief of erectile pain. One patient who did not have improvement had received ultrasound treatments without significant change. His presenting symptoms were minimal and he was able to have intercourse. The other patient had no response after 14 treatments and vitamin E supplement. He did not re-

TABLE 2. Evaluation of response to ultrasonic therapy for Peyronie's disease in 25 patients (1959-1970)

Age (yrs.)	No. Treatments and Courses	Lesion(s) Size*	Erection and Intercourse†	Followup Period	Comments
42	12	↓	+	8 mos.	Rapid improvement
47	27	↓	+	8 yrs.	Calcification by x-ray. Vit. E discontinued
65	12	0	+	2 mos.	2 lesions initially. Vit. E
51	14	↓	+	17 mos.	Rapid improvement
58	11 + 11 + 10	↓	+	5 yrs.	Retreated for chordee
33	12	↓	+	6 yrs.	Vit. E and x-ray no help, responded to ultrasound
48	30 + 24 + 13 + 12	↓	+	17 mos.	4 lesions treated, good response
58	13 + 12	0	+	5 mos.	Vit. E. 2 courses, good response
46	12 + 12	↓	+	6 yrs.	Vit. E, calcification by x-ray
64	12	↓	+	4 mos.	Rapid improvement, lesion almost gone
44	6 + 12	↓	+	5 yrs.	Vit. E no help, good response to ultrasound
47	32	0	0	18 mos.	Few symptoms initially, no improvement
56	11	↓	+	11 yrs.	Vit. E no help, slight improvement
76	16	↓	+	2 yrs.	Vit. E, good response
54	12 + 12 + 12	↓	+	2 yrs.	Slow response, 3 courses—Dupuytren's contracture. 2 lesions
46	16	↓	+	4 mos.	Rapid response
59	12	↓	+	4 mos.	Rapid response, Dupuytren's contracture treated
58	5	0	+	13 mos.	Good response
71	16 + 13	↓	+	4 yrs.	Vit. E no help and discontinued, 2 lesions. Lesions almost gone
51	15	↓	+	2 yrs.	Vit. E, 2 lesions
44	12	0	+	1 mo.	Good response, vit. E no help
47	14	0	0	10 mos.	Vit. E, no response, ? needs more treatment
52	16 + 12	↓	+	19 mos.	Vit. E no help (continued), 2 lesions treated
54	12 + 12	↓	+	5 yrs.	No response to first course, responded to second course
57	9	↓	+	6 yrs.	Good response, vit. E no help, Dupuytren's contracture

\* No change = 0; decrease = ↓.

† Improved = +; no change = 0.

turn for a further course of ultrasound which was recommended.

The size of the plaque or plaques was considered to have decreased in 19 cases and was described as "difficult to find" in 3 of these patients after treatment. It was difficult to judge small changes in the size of lesions and the occurrence of new plaques distorted this parameter (table 2).

#### DISCUSSION

Our clinical study further evaluates the application of ultrasonic therapy in the management of Peyronie's disease. Previous reviews suggest its efficacy and lack of morbidity.<sup>24-27</sup> The mechanism of action of ultrasound in this lesion is not known but the production of heat in the involved area may be a factor in the relief of symptoms and physical findings. Our experience with this group of symptomatic patients suggests the value of a course of therapy with ultrasound. Initially, the patient should receive a course of 12 treatments on consecutive days, except weekends. An intensity of 1.5 watts per cm.<sup>2</sup> for 5 minutes seems adequate for each treatment. Prolonged exposure with higher intensity could prove harmful. Careful placement of the mobile metal head applicator and use of a mineral oil coupling agent result in an excellent response. The urologist and the therapist must work closely in establishing maximum patient rapport and proper localization of the lesion.

The plaque did not seem to increase after treatment; in all instances it remained the same or decreased in size. In a few cases it may actually disappear. New lesions may occur and repeat

courses of therapy are indicated and well tolerated.

Further therapy is indicated if the response to 12 treatments does not yield clinical improvement. Most patients seem to derive benefit within a month of treatment and some after only 3 to 5 treatments. This is in contrast to other studies which indicate 20 to 30 treatments are required for relief of symptoms. Improvement in intercourse and more adequate erection, less chordee and diminished pain are the objectives. Since these represent subjective responses to questioning, evaluation of results remains difficult. The relatively rapid response to ultrasound therapy noted in our series of patients suggests it is a true response and not the result of the resolution characteristic of the natural history of the disease described by Williams.<sup>4</sup>

#### SUMMARY AND CONCLUSIONS

Peyronie's disease remains a condition without known etiology; it is characterized by penile induration and, in some patients, produces difficulty with intercourse and discomfort. Many forms of therapy have been used and results seem encouraging in most regimens prescribed. The use of ultrasound has been evaluated and a protocol for treatment has been suggested.

Subjective clinical improvement was noted in 23 of 25 cases treated. Reduction in plaque size also occurred in most cases. The mode of therapy resulted in no complications and repeat courses may be given when required for new lesions or for recurrent symptoms.

Mr. Louis Greco administered the ultrasonic therapy.