

Twenty Months Experience with the "PTS"

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Many questions have been asked of prosthetists in our area about the "PTS Prosthesis," since it was first presented by Marschall and Nitschke in the June, 1966 and March, 1967, Orthopedic and Prosthetic Appliance Journal. We note that many people prefer to use other terms for this prosthetic fitting, such as "Modified PTB Prosthesis with Molded Supra-condylar—Supra-patellar Suspension," but for the sake of brevity, and not desiring to argue the point of terminology here, we will use the term of the original authors, "PTS".

The technical aspects of the PTS have been well presented by these two gentlemen in Journal Articles, National Assemblies, and Regional Meetings in the past. Therefore, we will not even touch on technical aspects, but confine ourselves to answering those questions concerning, "how extensively have you used the PTS, what type of patients and stumps can be fitted with it, how successful has it been, how do you, as a prosthetist, like the PTS, etc.?"

The following charts show statistics on each individual patient fitted with a PTS Prosthesis in our two facilities in Syracuse and Rochester, during a twenty-month period from May, 1966, through December, 1967.

Ninety-four patients (28 female and 66 male) are shown in this study, of which three were bilateral below-knee amputees fitted bilaterally with the PTS, making a total of ninety-seven below-knee stumps fitted with the PTS prosthesis. These ninety-seven represent 100% of all PTS attempted, and 35% of the total number of below-knee prostheses fitted during the same period. At the same time, 26% of all BK amputations were fitted with PTB, and 39% had side joints and thigh lacer incorporated into their prostheses.

All ninety-seven were prescribed by, and followed to various extents, by a prosthetic clinic or an individual physician. None of the patients were selected on the basis of being used in a study, but were selected, utilizing normal prescription criteria, and with the intent that the PTS was the best prosthesis for the individual. However, some were prescribed when chronic stump problems persisted with other types of prostheses, and no other alternative was found.

The age shown in the chart is the patient age at the time of the first PTS fitting. The ages range from seven to eighty-nine, and average fifty-two. There was no reluctance to fit someone younger than seven, but there were none presented. Age did not appear to be a significant criterion in the prescription, fitting, or success of the prosthesis.

The amputation date shown in the chart is the last amputation or major surgical revision of the stump, prior to PTS fitting. The length of time between surgery and prosthetic fitting did not appear to be any greater or any less with the PTS. Neither did stump shrinkage, or atrophy appear to cause any greater need for, or less need for, replacement sockets.

Many of the listed causes of amputation are very general, but we think sufficiently self-explanatory for this paper. No evidence was found that would indicate that the PTS should, or should not, be used with any specific cause of amputation. It was noted numerous times,

in patients who had previously shown problems of edema or breakdown at the distal end of the stump, that when they were fitted with the PTS, the problem areas cleared up and the problems were eliminated. In our opinion, this indicates less proximal restriction in this prosthesis.

Stump lengths were measured from the medial tibial plateau to the end of the stump and these ninety-seven range from a short $2\frac{3}{4}$ inches to a long 12 inches. We found that we could successfully fit many short stumps with the PTS, which we could not fit with the PTB. Long stumps presented no problems in donning and removing the PTS, as some people had anticipated.

Twenty-one preparatory prostheses were fitted, fifteen PTS and six PTB. Some of the preparatory sockets were plaster of Paris and some with soft inserts, but no record was kept on how many of each. The decision to fit or not to fit preparatory prostheses was determined merely by the physician's opinion of "early fittings" and is incidental to this paper.

In forty cases, the PTS was the first type of prosthesis fitted (including preparatory PTS). Fourteen cases changed directly from a prosthesis with side joints and thigh lacer, and forty-three from PTB. A discussion of these results follows in later paragraphs.

Occupational classifications are general and fail to show the activities followed by the individual, which in many cases does not indicate how extensively the prosthesis is being used. While classifications

such as Construction and Machinist indicate hard use of a prosthesis, the term Retired would tend to indicate light use, however, in many of these Retired cases it means more extensive use, such as part time jobs, or hunting, fishing, etc.

We have attempted to evaluate the Results Column very realistically and without prejudice. While judgment enters into this considerably, we have in all cases arrived at the result after consultation with the patient and/or the physician.

In only eleven instances out of the ninety-seven, the PTS was not the prosthesis of preference to the patient. However, two of the eleven are still wearing it. These two patients preferred the PTB to the PTS, but rather than altering their present PTS, their wishes were to wait until they could be fitted with a new PTB. We anticipate that by the time that they are ready for a new prosthesis, they will want to stay with the PTS fitting.

It was completely and flatly rejected by only three cases, two of those during the dynamic alignment period. One of the two went back to a conventional below-knee prosthesis and with the other one, the proximal trim lines were cut to those of a PTB and dynamic alignment completed. The other patient could not tolerate total weight bearing on the stump after a few months, and in this case the brim was cut to allow for the addition of side joints and thigh lacer, resulting in a satisfactory prosthesis.

Six of the eleven cases wore the PTS for short periods of time and

decided that they preferred the PTB, with which they had been quite happy previously. In four of these six cases, the PTS trim lines were cut to the level of PTB trim lines with no adverse effect to the alignment of the prosthesis, and a satisfactory PTB fit was maintained. In the other two, realignment of the prosthesis was necessary, and with one of the two a new socket was necessary, leaving speculation as to the fit of the socket as a PTS. None of these six people actually rejected the PTS, but their preference was the PTB.

The most consistent reason for PTB preference (six patients) was that the PTS was larger around the knee and with today's tight trousers, it caused more bulk inside the trousers. Two others had trouble kneeling. It should be recognized though, that all of these people had worn the PTB for some considerable length of time and were very happy with it.

One patient was discontinued from any prosthesis by her physician, due to her medical condition.

Five patients were rated as "Questionable" and with most of these we feel that they would probably be rated the same in any type of prosthesis.

Eighty of the ninety-seven are rated as Satisfactory and Very Satisfactory. Naturally, a number of these might well have been rated the same in other types of prostheses also. But we do want to point out that there are a number of these with short stumps, unstable knee joints, etc., that we

would not have even attempted to fit with the classic PTB. Acceptance by these patients ran very high in cosmesis, function, and comfort, and many felt that this was by far the finest type of prosthetic fitting they have ever had.

We naturally wish now that comparative statistics had been kept on patients fitted with other types of below-knee prostheses during the same period of time, so that more complete comparisons could be made.

Eight of the definitive PTS Prostheses in this study were hard sockets with foam ends, while the remainder had soft (UCB type) inserts.

Summary

We do not intend this paper to take anything away from the PTB or other types of below-knee pros-

theses, but merely show, statistically, that the PTS has had extensive clinical application and that it is another type of socket modification that the prosthetist has available to fit some of the many below-knee amputation problems he is faced with daily. It has proven to be highly acceptable to most amputees. We have seen some problem stumps fitted successfully with it when we could not do so with other types of prostheses. Physicians who have had experience with the PTS have accepted it highly. We feel that any prosthetist, who is skilled in PTB fitting can, following Nitschke and Marschall instructions and applying his own ability and experience, satisfactorily fit the PTS.

We feel that the PTS Prosthetic Fitting is "here to stay" and should be another consideration when a patient is being evaluated for a prosthetic prescription.

Identifi- Age

Identification	Age	Amputation Date	Cause	Stump Length	Preparatory		PTS Date	Other Prostheses		Occupation	PTS Results & Remarks
					PTB	PTS		Type	Date		
1879 M	52	6-19-65	Diabetic Gangrene	5-3/4"			5-66	11-67		Clerk	Very Satisfactory
1951 M	32	1-12-66	Fibro-Sarcoma	4-1/2"		6-66	8-66			Construction	Satisfactory - Deceased 10-67
1976 F	79	5-20-66	Arteriosclerosis	6-1/2"			6-66	9-66		Homemaker	Questionable
1991 F	56	5-64	Vascular	2-3/4"			6-66			Homemaker	Satisfactory
2097 F	15	7-19-58	Congenital Deformity	3-1/2"			7-66		Conv. PTB	1958-1961 4-61, 1-62, 9-62, 12-63, 3-65	Student Very Satisfactory Has very unstable knee
2182 M	55	6-20-66	Arteriosclerosis	5-1/2"	9-66		12-66	11-67		Machinist	Satisfactory
2205 M	76	4-22-63	Traumatic	5-3/4"					Conv. PTB	1963 7-66	Retired Rejected PTS 7-66 Deceased
2368 F	80	9-10-66	Diabetes	6"		9-66	12-66	5-67		Homemaker	Satisfactory
2389 F	78	2-2-66	Arteriosclerosis	3-1/4"			9-66			Housewife	Questionable
2372 F	52	3-65	Traumatic	6"			9-66		Conv.	7-65	Housewife Stopped wearing any prosthesis, due to medical reasons
2384 M	59	9-56	Tumor	5"			9-66		Conv. PTB	1956-1961 3-61, 5-63	Physician Satisfactory
2391 M	40	12-2-65	Traumatic	6"			9-66	11-67	Conv.	1966	Retired Satisfactory - Numerous other disabilities
2460 M	24	2-18-63	Osteomyelitis	6"			10-66		PTB	1963	Auto Mechanic Satisfactory - Prefers PTS
2461 F	22	12-15-64	Traumatic	5"			10-66		Mod. PTB w/ ischial bearing	11-65	Secretary Satisfactory - Fractured femur, require ischial bearing early
2466 F	23	1944	Congenital	5-1/4"			10-66		Conv. PTB	1946-1961 1961	X-ray technician Satisfactory - No Patella present
2513 M	75	9-30-56	Arteriosclerosis	5-3/4"		11-66	1-67				Retired Satisfactory
2520 M	65	5-12-66	Vascular	6-1/4"	6-66		11-66				Retired Very Satisfactory
2528 M	56	8-7-66	Traumatic	7"			11-66	3-67	PTB w/ corset	5-67, 12-67	Industrial Maintenance PTS did not work out, very sensitive stump
2532 F	65	5-24-66	Diabetes	3-1/2"			11-66	5-67			Homemaker Satisfactory - Now ready for new socket
2543 M	74	11-61	Arteriosclerosis	3-1/4"			11-66		PTB	7-61, 7-62, 4-63, 6-65, 8-66	Executive Satisfactory - Deceased 5-67
2571 F	25	3-66	Traumatic	4"			11-66				Unemployed Satisfactory - New socket presently indicated
2606 M	74	11-58	Traumatic	5-1/2"			11-66		Conv. PTB	1958-64 & 9-67 12-64	Caretaker Rejected PTS, went back to Conv.
2628 M	51	9-8-65	Traumatic	4"			11-66		Conv.	1965	Self employed construction Satisfactory
2691 M	58	4-26-66	Arteriosclerosis	8"			12-66				Salesman Satisfactory
2696 M	47	4-2-63	Traumatic	5-1/4"			12-66		PTB	5-63, 2-64	Carpenter Satisfactory - Prefers PTS
2709 M	40	3-10-54	Traumatic	4-1/2"			12-66		Conv. PTB	1954-1962 12-62, 7-63, 11-64	Small engine Mechanic Rejected PTS 2-67, due to difficulty kneeling while working
2752 M	32	1952	Traumatic	5"			12-66		Conv. PTB	1953-1964 1964	Farmer Questionable
2756 M	25	3-26-52	Traumatic	3"			12-66		Conv. PTB	1952-1961 4-61, 12-62	Salesman Changed back to PTB 2-67, bulk around knee
2805 F	19	9-5-64	Traumatic	3"			1-67	10-67	PTB w/ quad ischial A/K socket	4-65	Student Satisfactory - Removed quad. brim & used std. corset til fitted w/PTS
2815 M	35	11-1-51	Traumatic	8-1/4"			1-67		Conv. PTB	1951-62 & 4-66 7-62, 7-63, 1-65	Insurance claims Satisfactory - Tried all types & had problems, PTS OK to date
2873 M	41	10-8-61	Traumatic Bilateral	R. 7" L. 6"			R. 1-67		PTB w/ corsets	R & L. 1961-66 8-66	Operated store Questionable - Corset on left, PTS on right

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					PTB	PTS	Date	Type	Date			
2874 M	30 *	8-4-66	Traumatic Bilateral	R. 6-1/2" L. 12"		L. 11-66	L. & R. 1-67				Janitor	Satisfactory
2936 M	72	3-18-58	Diabetic	8-1/4"			2-67	Conv. PTB	1958-1962 8-62, 11-65		Retired	Very Satisfactory
2987 M	47	9-7-46	Traumatic	5-1/4"			2-67	Conv. PTB	1946-1962 10-62, 8-64		Machinist	Satisfactory
2999 M	62	2-67	Vascular	5-1/4"		3-67					Unemployed	Satisfactory - Unable to follow for definitive
3015 M	37	10-3-52	Traumatic	5-1/2"			3-67	Conv. PTB	1952-1961 4-61, 12-62, 12-64		Bookkeeper	Rejected PTS - Presently refitting with PTB
3026 F	29	7-30-65	Traumatic	5-3/4"			3-67	PTB	1-66		Housewife	Very Satisfactory
3040 M	41	11-26-55	Traumatic	9-3/4"			3-67	Conv. PTB	1955-1962 1962-1967		Electrician	Very Satisfactory
3043 M	55	L. 11-20-66 R. 5-14-67	Diabetes	L. 5" R. 5-7/8"			L. 3-67 R. 9-67				Retired	Very Satisfactory
3102 M	65	2-2-66	Arteriosclerosis	5"			3-67				Retired	Satisfactory - Deceased 10-67
3110 F	76	2-26-66	Vascular	5-7/8"	12-66		3-67				Housewife	Satisfactory
3124 M	64	2-1-49	Traumatic	5-1/2"			3-67	Muley PTB	1949-1961 5-61, 5-64		Retired	Satisfactory & has been on any prosthesis
3127 M	26	3-17-67	Traumatic	5"		3-67	5-67	10-67			Construction	Satisfactory - Operates heavy equip.
3130 M	77	3-14-67	Arteriosclerosis	6-3/4"			5-67	8-67			Retired	Satisfactory
3131 M	59	1-18-65	Vascular	6-1/4"			3-67	PTB	6-65		Banker	Satisfactory
3149 M	41	3-8-66	Vascular	8"	4-66		4-67	PTB w/ coset	7-65, 10-66		Mechanic	Satisfactory
3223 F	31	8-66	Traumatic	5-1/2"			4-67	12-67	Conv. PTB	1966-1963 8-63, 8-64	Housewife	Satisfactory - Bird hunts, very active
3242 M	46	6-2-42	Traumatic	6-1/2"			4-67	Conv. PTB	1942-1962 12-62, 5-64		Truck driver	Rejected PTS - Brim cut down to PTB 6-67
3255 M	43	1-5-66	Osteomyelitis	6-1/4"			4-67	PTB w/ coset	4-66		Retired	Satisfactory - other disabilities
3304 F	67	2-14-67	Arteriosclerosis	5-1/2"	3-67		5-67	11-67			Housewife	Very Satisfactory
3316 M	58	L. 12-23-66 R. 6-67	Arteriosclerosis	L. 5-1/2"			L. 5-67	R. prep. A/K	8-67		Machine layout	Satisfactory
3364 M	64	5-1-67	Diabetes	5"		5-67	9-67				Parole Officer	Satisfactory - Blind
3368 M	54	1958	Osteomyelitis	5"			5-67	Conv. PTB	1958-1962 5-62, 11-64		Mechanic	Questionable
3377 F	77	6-66	Diabetic Gangrene	7-1/4"			5-67				Homemaker	Satisfactory
3384 F	45	10-21-65	Traumatic	5"			5-67	PTB w/ coset	3-66		Housewife	Satisfactory
3417 M	70	1921	Traumatic	7"			6-67	Conv.	1921-1967		School-crossing guard	Satisfactory - Distal end problems other pros. no problems to date
3439 M	33	8-64	Traumatic	7-1/2"			6-67	PTB	12-64, 8-65		Engineer	Very Satisfactory
3468 F	48	10-2-66	Traumatic	4"			6-67	PTB	3-67		Housewife	Very Satisfactory
3527 M	41	1945	Traumatic	6-1/4"			6-67	Conv. PTB	1946-1962 1-62, 12-66		Administrator	Satisfactory - Other amputations R.B./E.L.P./H.L. Syme
3529 F	68	1-67	Diabetic Gangrene	5-1/4"			6-67				Homemaker	Satisfactory
3549 M	64	7-17-64	Arteriosclerosis	4"			7-67	PTB	12-64, 12-65		Foreman	Satisfactory - Opposite leg amputated 11-67 not fitted
3578 M	42	5-8-45	Traumatic	5-1/2"			7-67	Conv. PTB	1945-1961 8-61, 8-64, 12-66		Clerk	Rejected PTS prefers PTB
3589 M	63	4-29-67	Diabetic Gangrene	7-1/4"			7-67				Retired	Satisfactory

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					PTB	PTS		Type	Date		
3609 M	45	2-15-67	Vascular	4-1/4"			7-67			Drives Floral truck	Satisfactory
3611 M	73	12-30-61	Traumatic	5"			7-67	PTB	6-62, 1-63, 9-63, 9-64, 5-66	Mechanic	10-67 PTS brim cut down to PTB, realignment on Adj. leg
3616 M	41	3-5-54	Traumatic	5"			7-67	Conv. PTB	1954-1961 4-61, 6-63, 4-66	Operating Engineer	Very Satisfactory
3632 M	35	1-11-67	Traumatic	8"			7-67	12-67		Logging Truck driver	Very Satisfactory
3703 M	65	6-66	Diabetic	7"			8-67			Retired	Satisfactory
3726 M	55	12-65	Gangrene	6"			8-67	Conv.	4-66	Homemaker	Satisfactory
3727 M	26	1945	Traumatic	4-3/8"			8-67	Conv.	1945-1967	Engineer	Satisfactory
3773 F	63	7-20-67	Arteriosclerosis	5-3/4"		8-67	11-67			Homemaker	Apparently Satisfactory - Deceased 12-67
3818 F	42	1952	Traumatic	8-1/4"			8-67	Conv.	1952-1967	Carnival Worker	Satisfactory
3864 F	66	1962	Arteriosclerosis	5-5/8"			9-67	PTB	1962-1967	Housewife & Bookkeeper	Satisfactory
3901 M	85	7-13-62	Vascular	3-1/2"			9-67	PTB	1962-1967	Retired	Rejected PTS cut back to PTB 12-67
3922 M	64	8-10-67	Arteriosclerosis	5-1/4"		9-67	12-67			Operates Restaurant	Satisfactory
3931 F	16	9-56	Traumatic	7"			9-67	Conv. PTB	1956-1962 5-62, 5-65, 8-66	Student	Very Satisfactory
3946 M	64	6-67	Diabetes	7-1/4"			10-67			Retired	Satisfactory
3949 M	75	1953	Traumatic	6"			10-67	Conv. PTB	1953-1960 11-60	Retired	Does not find any difference in comfort
3953 M	46	1946	Traumatic	5-3/4"			10-67	Conv. PTB	1946-1962 7-62, 6-63	Inspector	Very Satisfactory
3966 F	71	1-11-65	Diabetes	5"			10-67	Conv.	11-65, 5-66	Housewife	Satisfactory
4007 M	66	10-1-67	Arteriosclerosis	5-3/4"		10-67 12-67				Physician	Very Satisfactory
4067 M	35	4-7-56	Traumatic	3-1/8"			PTB 11-67	Conv. PTB	1956-1962 1962-1967	Postal Clerk	Rejected PTS during dynamic & fitted as PTB
4074 F	51	1924	Gangrene	7-1/4"			11-67	Conv. PTB	1924-1963 3-63	Restaurant Hostess	Satisfactory
4090 M	76	7-1-67	Diabetic Gangrene	6"	7-67		11-67			Retired	Satisfactory
4093 M	70	L. 1938 R. 1948	Frostbite Bilateral	L. 7" R. 7"			11-67	Conv. PTB	1938-1960 1960-1964	Prosthetist Orthotist	Very Satisfactory
4117 F	75	8-28-67	Diabetic Gangrene	4-3/8"			11-67			Homemaker	Satisfactory
4131 M	24	4-22-65	Traumatic	7"			11-67	PTB Conv.	8-65 4-66	Maintenance	Satisfactory
4140 F	18	1949	Congenital	9"			11-67	Conv. PTB	Dates not available	Student	Satisfactory
4154 M	85	8-67	Vascular	5-3/4"		8-67				Retired	Very Satisfactory - Deceased 12-67
4167 M	57	1962	Traumatic	5-1/2"			11-67	PTB	several 1962-1967	Toolmaker	Very Satisfactory
4205 F	7	1963	Correct congenital deformity	7-5/8"			12-67	PTB	1963-1967	Student	Very Satisfactory
4218 M	71	R. 11-28-66 L. 11-67	Arteriosclerosis Frostbite	R. 7-1/2" L. 8"			R. 12-67	R. PTB	3-67	Retired	Satisfactory
4229 M	61	8-14-67	Vascular	6-1/4"			12-67			Cabinet builder	Satisfactory
4260 M	25	10-5-67	Traumatic	6"		12-67				Engineer	Satisfactory