

# Long-term Rectal Function Following Permanent Prostate Brachytherapy

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## Purpose

To evaluate the effect of prostate brachytherapy with or without supplemental therapies on long-term rectal function by means of a patient-administered quality of life instrument.

## Materials and Methods

As part of an ongoing prospective evaluation, 164 of an initial 209 patients who remain alive were mailed the Rectal Function Assessment Score (R-FAS) with a pre-stamped return envelope. R-FAS scores range from 0-27 with lower scores indicative of better bowel function. Of the 162 eligible patients, 161 (99.4%) returned the survey. Median follow up was 9.0 years (range 8.2-11.2 years). Clinical, treatment and dosimetric parameters evaluated for bowel function included patient age, diabetes, hypertension, tobacco consumption, clinical T-stage, elapsed time since brachytherapy, ultrasound volume, planning target volume, androgen deprivation therapy, supplemental external beam radiation, isotope, rectal dose, prostate D100/150/200 and prostate D90.

## Clinical, treatment and dosimetric parameters of evaluated brachytherapy patients

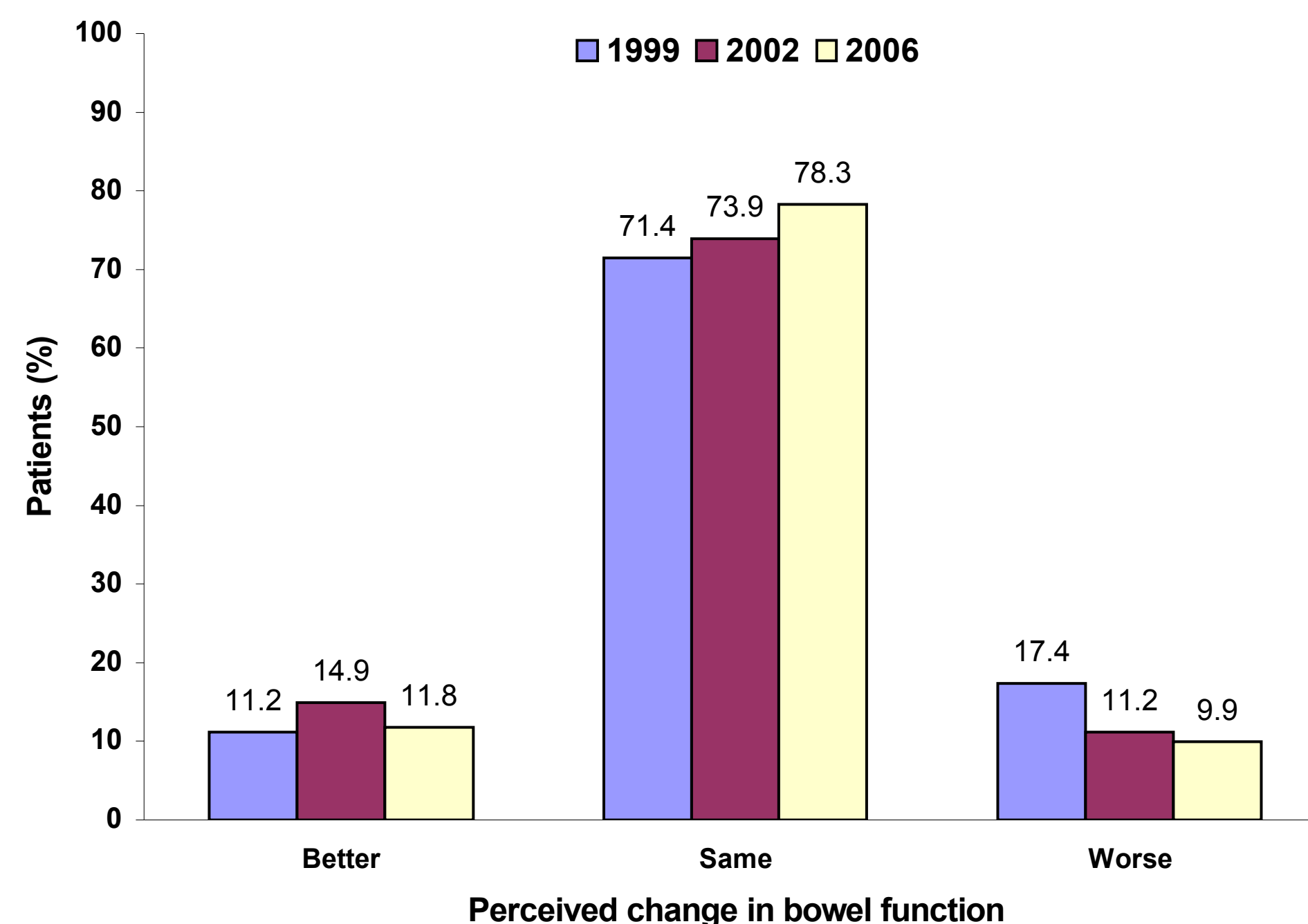
Variable	Most Recent Survey (2006), n = 161		
	Mean ± SD	Median	t-test p
Age (years)	65.6 ± 6.9	67.0	
Follow up (years)	9.2 ± 0.9	9.0	
Gleason Score	6.5 ± 1.0	7.0	
Stage		T2a	
PSA (ng/mL)	9.8 ± 7.4	8.0	
BM/day preimplant	1.5 ± 0.6	1.3	
Prostate Volume (cm <sup>3</sup> )	37.9 ± 10.2	37.6	
Androgen Dep. Therapy (months)*	6.5 ± 8.2	4.0	
V100 (% volume)	89.7 ± 8.8	92.1	
V150 (% volume)	43.5 ± 12.7	42.9	
V200 (% volume)	17.9 ± 7.5	17.0	
D90 (% min. peripheral dose, mPD)	99.8 ± 13.4	100.9	
Total activity (mCi)			
<sup>125</sup> I monotherapy	45.7 ± 5.9	45.7	
<sup>125</sup> I boost	35.2 ± 4.5	34.8	
<sup>103</sup> P monotherapy	203.2 ± 11.2	203.2	
<sup>103</sup> P boost	140.8 ± 19.9	142.6	
Average rectal dose (% mPD)			
<sup>125</sup> I	85.9 ± 10.7	86.0	<0.001
<sup>103</sup> P	67.6 ± 18.2	66.4	
Median rectal dose (% mPD)			
<sup>125</sup> I	85.9 ± 10.71	86.2	<0.001
<sup>103</sup> P	67.6 ± 18.2	66.4	
Maximum rectal dose (% mPD)			
<sup>125</sup> I	124.4 ± 23.9	116.8	0.013
<sup>103</sup> P	107.2 ± 40.8	94.7	
	Count		
Supplemental external beam:			
yes	94		
no	67		
Androgen Deprivation Therapy (ADT):			
yes	36		
no	125		
Supplemental beam and ADT:			
yes	19		
no	142		

\* Only those who had androgen deprivation therapy were included (n=36).

## Results

For the entire cohort, the current R-FAS was 3.59 which represented a non-statistical improvement from prior surveys in 1999 (4.29) and 2002 (3.92) ( $p = 0.134$ ). Only 16 patients (9.9%) reported bowel function to be worse following brachytherapy. Of the evaluated clinical, treatment and dosimetric parameters, only the number of pre-implant bowel movements, tobacco use and diabetes correlated with R-FAS. Despite lower rectal doses with Pd-103, isotope did not predict for bowel function. Consistent with prior surveys, patient perception of overall rectal quality of life was inversely related to supplemental external beam radiation ( $p = 0.027$ ).

## Perceived changes in bowel function over time



\* Only those who completed all three surveys (n = 161) were included.

## Statistically significant correlations of clinical and implant parameters with survey questions over time with the current patient cohort

Question	1999 Survey (n = 161)			2002 Survey (n = 161)			2006 Survey (n = 161)		
	Parameter	Corr.*	p	Parameter	Corr.*	p	Parameter	Corr.*	p
1 Frequency	Preimplant BM	0.58	<0.01	Preimplant BM	0.57	<0.01	Preimplant BM	0.46	<0.01
2 Consistency	—	—	—	Preimplant BM	0.27	<0.01	Avg. rectal dose	0.23	0.02
	—	—	—	—	—	—	Med. rectal dose	0.25	0.01
	—	—	—	—	—	—	Max. rectal dose	0.22	0.03
3 Urgency	—	—	—	Preimplant BM	0.21	<0.01	Avg. rectal dose	0.26	0.01
	—	—	—	—	—	—	Med. rectal dose	0.29	0.01
	—	—	—	—	—	—	Diabetes <sup>†</sup>	-0.20	0.01
4 Abdominal discomfort	—	—	—	—	—	—	Time to survey	-0.22	0.01
	—	—	—	—	—	—	Tobacco use <sup>‡</sup>	0.17	0.03
5 Hemorrhoidal bleeding	—	—	—	PSA	-0.25	<0.01	PSA	-0.19	0.01
	—	—	—	Tobacco use <sup>‡</sup>	0.19	0.02	Tobacco use <sup>‡</sup>	0.18	0.03
	—	—	—	Age	-0.17	0.04	Max. rectal dose	-0.25	0.01
6 Rectal bleeding	Time to survey	-0.18	0.03	Time to survey	-0.20	0.01	Max. rectal dose	-0.22	0.04
	—	—	—	—	—	—	Hypertension <sup>†</sup>	-0.16	0.04
7 Continence	—	—	—	Preimplant BM	0.27	<0.01	—	—	—
8 Nighttime BM	—	—	—	—	—	—	Hypertension <sup>†</sup>	0.20	0.01
	Avg. rectal dose	0.24	0.02	—	—	—	—	—	—
	Max. rectal dose	0.24	0.02	—	—	—	—	—	—
9 Completeness	—	—	—	Age	0.16	<0.05	—	—	—
	—	—	—	Preimplant BM	0.17	0.03	Preimplant BM	0.19	0.01
Total Score	Preimplant BM	0.21	<0.01	Preimplant BM	0.33	<0.01	Preimplant BM	0.24	<0.01
	—	—	—	Diabetes <sup>†</sup>	-0.17	0.03	Diabetes <sup>†</sup>	-0.17	0.03
	—	—	—	Tobacco use <sup>‡</sup>	0.18	0.02	Tobacco use <sup>‡</sup>	0.18	0.02

\* Spearman's rho nonparametric correlation coefficient  
† Categorical variable

## Comparison of survey responses of patients in 1999, 2002 and 2006 stratified by external beam treatment

No.	Item	1999 survey n = 161		2002 survey n = 161		2006 survey n = 161		Within factor (time) p	Between factor (therapy) p
		Mono	XRT	Mono	XRT	Mono	XRT		
1	Frequency	0.66	0.79	0.78	0.84	0.54	0.62	<0.001	0.365
2	Consistency	0.60	0.70	0.55	0.60	0.48	0.52	0.016	0.392
3	Urgency	0.63	0.69	0.58	0.71	0.64	0.69	0.951	0.382
4	Abdom. Discomfort	0.24	0.28	0.24	0.23	0.18	0.33	0.873	0.334
5	Hem. Discomfort	0.27	0.35	0.27	0.28	0.27	0.37	0.642	0.451
6	Rectal Bleeding	0.21	0.44	0.27	0.33	0.22	0.29	0.420	0.134
7	Continence	0.44	0.34	0.51	0.38	0.32	0.46	0.484	0.644
8	Night BM	0.08	0.08	0.04	0.03	0.07	0.07	0.189	0.847
9	Completeness	0.57	0.57	0.55	0.50	0.52	0.47	0.405	0.683
	Total Score	3.68	4.23	3.79	3.90	3.24	3.82	0.130	0.307

## Conclusion

Prostate brachytherapy adversely affects bowel function. However, in most patients the changes are minimal and slowly resolve with time. Overall rectal quality of life is inversely related to supplemental external beam radiation.