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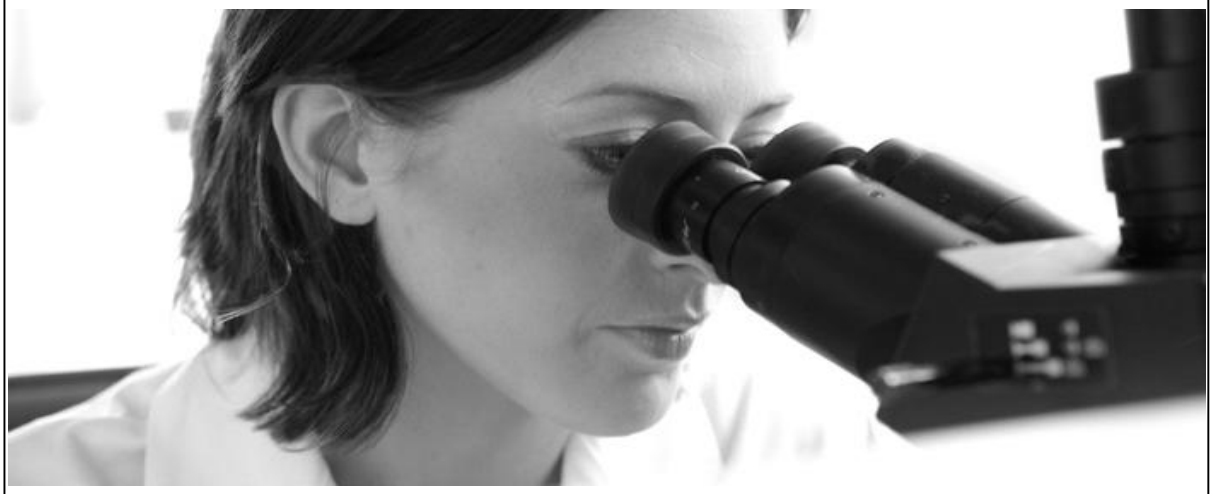

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RESEARCH ARTICLE

BRENT BROTZMAN PROTOCOL FOR IMPROVING HIP RANGE OF MOTION IN PROFESSIONAL FAST BOWLERS WITH LOW BACK PAIN

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ABSTRACT

It is estimated that 10- 15% of the athletic population experiences back injuries. Athletes who participate in sporting events that require repeated hyperextension or flexion of the spine, such as cricket pace bowlers, may be particularly at risk. This study aims to find the effectiveness of Brent Brotzman Protocol in improving hip range of motion in professional fast bowlers with low back pain. 20elite professional cricket fast bowlers (mean age of 25.65) who had low back pain underwent Brent Brotzman rehabilitation protocol for 12 weeks. The outcome measures are bilateral hip range of motion. Pre – post rehabilitation measurements were compared using t test. The Results of the study showed that the range of motion of bilateral hip improved statistically significantly ($p<0.001$). This study concludes that Brent Brotzman Rehabilitation protocol is very effective in improving hip range of motion in professional fast bowlers with low back pain.

INTRODUCTION

Cricket has had a history of being regarded as a leisurely, gentleman's game (Clark, 1996). Today, with a solid ball weighing approximately 156 grams propelled from a distance of 20m at a speed of about 140 km/h to an awaiting batter, it can hardly be called a gentleman game (Stockhill& Bartlett, 1993). Bowling involves repetitive twisting, extension and rotation in a short period while body tissues and footwear must absorb large ground reaction forces. However, it is the speed and the force of the action that singles fast bowlers out as being particularly prone to injury. The fast bowler uses one of two bowling techniques or a combination of these, known as side-on, front-on or mixed bowling. Particular bowling techniques predispose bowlers to injury more than do others. Bowling too many overs in a single spell or bowling for too many spells is another factor which predisposes the fast bowler to injury. High performance young fast bowlers are more likely to bowl excessively throughout the growth period when the spine is immature. As a result they are more vulnerable to injury as the forces associated with fast bowling are unable to be absorbed. Mechanical factors are widely accepted in the aetiology of degenerative process and particularly to injuries of the lumbar spine. This is especially relevant in fast bowling, where a player must absorb both vertical and horizontal components of the ground reaction force up to a half of a tonne (Watson, 2005) during foot impact in the delivery stride. Such forces are transmitted to the spine through the lower limb, where the additional forces caused by rapid trunk hyperextension/flexion, lateral flexion and twisting are added as a result of the bowling action during delivery. The upper body motion at delivery is produced by counter-rotation away from the batsman in the transverse plane about the longitudinal axis of the body. Counter-rotations of 12-40% of shoulders on pelvis during delivery stride have been predicted to increase the incidence lumbar spondylolysis, disc abnormality and muscle injury in fast bowlers (Elliot, *et al*, 2002). To address improving trunk and hip mobility, this study focused on a set of training protocol as this has been shown to be a safe and effective way of increasinglumbar and hip joint mobility (Herzog *et al*., 1988; Gal *et al*., 1994; Herzog, 2000; Gatterman, 2003).

METHODOLOGY

This was a randomized, controlled, prospective, investigative trial. 45 fast bowlers were given screening questionnaire table1 from various professional cricket academies and teams who are professionally participating in league matches

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regularly. Out of them, 20 elite fast bowlers who have Low Back Pain were taken to this study. Among those 20 bowlers, 15 were using mixed bowling action. 3 bowlers were bowling in side- arm action and 2 were using front- arm bowling action. The study was performed at Southern Railway stadium, Perambur, Chennai. All the subjects signed an informed consent form after carefully reading the information sheet provided by the researcher. The subjects were included in the study if they fulfil the following criteria. Only male subjects, who were between the ages of 18 to 35 years who have been playing Action Cricket for at least six months. Subjects who had any injuries in lower limb, cervical pain or any other medical ailment that will interfere with the study results according to the researcher, player who were all-rounder or part time wicket keepers were excluded. The outcome measures of this study were Hip joint Range of motion Both Side - Flexion, Extension, Abduction, Adduction, Internal rotation and External rotation. Range of motion measures for hips were taken using goniometry.

Table 1 screening questionnaire

S. No	Demographic parameter	Mean	Standard Deviation
1.	Age	25.65	2.47
2.	Mass (in kg)	75.9	6.49
3.	BMI (in kg/m2)	24.81	1.48
4.	Duration of Bowling (in years)	11.8	1.98
5.	Average overs per week	44.5	9.44

Table 2 Demographic Data of participants

S. No	Demographic parameter	Mean	Standard Deviation
1.	Age	25.65	2.47
2.	Mass (in kg)	75.9	6.49
3.	BMI (in kg/m2)	24.81	1.48
4.	Duration of Bowling (in years)	11.8	1.98
5.	Average overs per week	44.5	9.44

The results are presented as mean and standard deviation (mean± SD). The outcome measures were used before the intervention, at the end of 6th week and at the end of 12th week.

Table 3 Test for Hip Flexion (Right) (unit - degree)

		Mean	Sdt. Deviation	t - value	Significance
Pair 1	Pre- Test	96	8.417	14.12	0.000*
	6th week	112.05	7.957		
Pair 2	6th week	112.05	7.957	15.543	0.000*
	12th week	127.65	6.115		
Pair 3	Pre- Test	96	8.417	25.261	0.000*
	12th week	127.65	6.115		

Table 4 T-Test for Hip Flexion (Left) (unit - degree)

		Mean	Sdt. Deviation	t – value	Significance
Pair 1	Pre- Test	94.85	6.683	13.809	0.000*
	6th week	109.45	7.302		
Pair 2	6th week	109.45	7.302	14.874	0.000*
	12th week	125.40	5.452		
Pair 3	Pre- Test	94.85	6.683	28.889	0.000*
	12th week	125.4	5.452		

Table 5 T-Test for Hip Extension (Right) (unit - degree)

		Mean	Sdt. Deviation	t – value	Significance
Pair 1	Pre- Test	25.65	3.588	12.918	0.000*
	6th week	32.40	3.633		
Pair 2	6th week	32.40	3.633	9.911	0.000*
	12th week	38.35	2.777		
Pair 3	Pre- Test	25.65	3.588	17.765	0.000*
	12th week	38.35	2.777		

Changes during the 12 weeks were calculated and compared between groups using Student's paired t tests with 99% confidence intervals (CIs). Two-tailed significance tests were used in all the statistical analysis.

Table 6 T-Test for Hip Extension (Left) (unit - degree)

		Mean	Sdt. Deviation	t – value	Significance
Pair 1	Pre- Test	24.45	3.137	9.796	0.000*
	6th week	30.25	3.323		
Pair 2	6th week	30.25	3.323	9.234	0.000*
	12th week	36.40	2.583		
Pair 3	Pre- Test	24.45	3.137	16.115	0.000*
	12th week	36.40	2.583		

Table 7 T-Test for Hip Abduction (Right) (unit - degree)

		Mean	Sdt. Deviation	t – value	Significance
Pair 1	Pre- Test	39.10	4.077	9.233	0.000*
	6th week	43.00	3.146		
Pair 2	6th week	43.00	3.146	9.609	0.000*
	12th week	48.05	2.743		
Pair 3	Pre- Test	39.10	4.077	13.344	0.000*
	12th week	48.05	2.743		

Table 8 T-Test for Hip Abduction (Left) (unit – degree)

		Mean	Sdt. Deviation	t – value	Significance
Pair 1	Pre- Test	37.80	3.942	6.791	0.000*
	6th week	41.40	3.016		
Pair 2	6th week	41,40	3.016	11.738	0.000*
	12th week	46.95	2.982		
Pair 3	Pre- Test	37.80	3.942	16.665	0.000*
	12th week	46.95	2.982		

Table 9 T-Test for Hip Adduction (Right) (unit - degree)

		Mean	Sdt. Deviation	t – value	Significance
Pair 1	Pre- Test	24.80	2.505	10.167	0.000*
	6th week	28.90	1,971		
Pair 2	6th week	28.90	1.971	8.391	0.000*
	12th week	33.10	2.808		
Pair 3	Pre- Test	24.80	2.505	20.193	0.000*
	12th week	33.10	2.808		

Table 10 T-Test for Hip Adduction (Left) (unit - degree)

		Mean	Sdt. Deviation	t – value	Significance
Pair 1	Pre- Test	23.90	2.553	7.310	0.000*
	6th week	27.85	2.540		
Pair 2	6th week	27.85	2.540	9.275	0.000*
	12th week	33.10	2.808		
Pair 3	Pre- Test	23.90	2.553	11.951	0.000*
	12th week	33.10	2.808		

Table 11 T-Test for Hip Internal Rotation (Right) (unit - degree)

		Mean	Sdt. Deviation	t – value	Significance
Pair 1	Pre- Test	29.80	2.505	16.927	0.000*
	6th week	35.75	2.712		
Pair 2	6th week	35.75	2.712	15.942	0.000*
	12th week	41.90	2.882		
Pair 3	Pre- Test	29.80	2.505	35.640	0.000*
	12th week	41.90	2.882		

Table 12 T-Test for Hip Internal Rotation (Left) (unit - degree)

		Mean	Sdt. Deviation	t - value	Significance
Pair 1	Pre- Test	28.25	2.173	9.367	0.000*
	6th week	33.75	2.245		
Pair 2	6th week	33.75	2.245	13.202	0.000*
	12th week	40.65	2.498		
Pair 3	Pre- Test	28.25	2.173	11.484	0.000*
	12th week	40.65	2.498		

Table 13 T-Test for Hip External Rotation (Right) (unit - degree)

		Mean	Sdt. Deviation	t – value	Significance
Pair 1	Pre- Test	39.00	2.991	15.919	0.000*
	6th week	45.10	3.597		
Pair 2	6th week	45.10	3.597	12.992	0.000*
	12th week	57.55	3.252		
Pair 3	Pre- Test	39.00	2.991	25.136	0.000*
	12th week	57.55	3.252		

Table 14 T-Test for Hip External Rotation (Left) (unit - degree)

		Mean	Sdt. Deviation	t – value	Significance
Pair 1	Pre- Test	37.40	2.664	9.488	0.000*
	6th week	44.20	2.668		
Pair 2	6th week	44.20	2.668	10.634	0.000*
	12th h week	54.65	3.407		
Pair 3	Pre- Test	37.40	2.664	27.479	0.000*
	12th week	54.65	3.407		

DISCUSSION

Exercise therapy that consists of individually designed programs, including stretching or strengthening, and is delivered with supervision may improve pain and function in chronic nonspecific low back pain. Strategies should be used to encourage adherence (Hayden JA *et al*., 2005). In our study the hip flexion of both sides were shown statistically highly significant ($p<0.001$) between pre and post test value (tables 3 and 4). Passive stretching exercises are often prescribed by clinicians and coaches for individuals with the goal of improving flexibility. The beneficial effects of passive stretching on improving hip flexion range of motion and the associated ability to perform a straight leg raise have been well documented (Tanigawa MC *et al*., 1972).

Kottke and associates reported the ROM data of 10 patients of varying ages and pathologies with improved hip extension ROM, presumably due to receiving treatments of sustained passive stretching of 20 minutes' duration.

The hip extension of both sides were shown statistically highly significant ($p<0.001$) between pre and post test value (tables 5 and 6).In this study hip abduction of both sides were shown statistically highly significant ($p<0.001$) between pre and post test value (tables 7 and 8). The hip adduction of both sides were shown statistically highly significant ($p<0.001$) between pre and post test value (tables 9 and 10).

This shows that the rehabilitation program which we used was effective in low back pain management. Bilateral hip internal rotation shows statistically highly significant ($p<0.001$) between pre and post test value (tables 11 and 12). Our study results state that bilateral hip external rotation shows statistically highly significant ($p<0.001$) between pre and post test value (tables 13 and 14).

There is conflicting evidence on the effectiveness of exercise therapy compared to inactive treatments for chronic low back pain. Exercise therapy was more effective than usual care by the general practitioner and equally as effective as conventional physiotherapy for chronic low back pain and may be helpful for chronic low back pain patients to increase return to normal daily activities and work

CONCLUSION

Thus this study concludes that Brent Brotzman Rehabilitation protocol is very effective in improving hip range of motion in professional fast bowlers with low back pain.

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