

L. Quagliarella, N. Sasanelli, V. Monaco, G. Belgiovine. Postural balance in hip and knee joint arthroplasty patients. *Gerontechnology* 2008; 7(2):192. Postural control in patients with Total Hip Arthroplasty (THA) or Total Knee Arthroplasty (TKA) are partially contradictory¹. We identified the clinically significant Postural Parameters (PPs) that enable differentiation between normal subjects and THA and TKA patients. **Materials and methods** All subjects (249) gave their informed consent; 59 healthy older adults (57±6 yrs) (RG), 190 in the experimental group (EG) (82 THA, 64±12 yrs; 108 TKA, 68±8 yrs). EG subjects were evaluated one or two days before surgery and at 6-month and one-year follow-up (f-up). All subjects received physiotherapy. Height and weight were measured while standing barefoot on the force platform in a self-chosen stance, with arms at the side, facing toward the positive AP direction of the force platform. The first trial was executed with Eyes Open (EO) and the second one with Eyes Closed (EC). A Kistler 9286A force plate and Digivec system (BTS SpA.) were used. Data were collected for 120s at 1,000Hz sampling frequency and processed by custom scripts in Matlab (The Mathworks). RG and EG differences were analysed in T1 time period, from 10s to 60s², while data from 61s to 120s T2) were matched with T1 for fatigue detection. The following parameters were adopted³: mean velocity (MV); root-mean-square distance (RMSD); sway area (SA); 95% power frequency (PF_95). RMSD and PF_95 were calculated in both Before-After (FA) and Medio-Lateral (ML) direction. When correlation (Pearson) among anthropometry and PPs was detected, PPs were normalized using a quadratic detrending. Non-parametric statistics was adopted with $\alpha=0.05$ (SSD). **Results and discussion** As expected, the SSDs between RG and EG show an increase in both RMSD and MV, i.e. a greater energy cost to maintain posture, especially in the ML direction. SA is the most robust parameter. PP values at follow-up in EG are less distant to those registered in RG, but there is no SSD across the values at the different observation intervals, nor was it possible to detected SSDs between THA and TKA. As expected⁴, a decrease of performance occurs at the 6th month follow-up compared to the pre-operative session and recovery seems to be slower in TKA as compared to THA. The decreased PP values in T2 call for a more in-depth analysis since they seem to contradict the widespread conviction that ascribes performance decrease to fatigue, especially in THA and TKA. A direct comparison with other studies is not possible because of differences in experimental design. Methodological harmonization is needed.

References

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Address: Università degli studi di Bari, Italy; E:

l.quagliarella@bioingegneria.uniba.it

Table 1 SSD p-values between groups (Kruskal-Wallis), referred to the pre-operative session (pre), the 6-month f-up session (6m) and 1-year follow-up session (12m), in both EO and EC conditions. Symbols: §§: $p \leq 0.0005$; §: $0.0005 < p \leq 0.001$; ++: $0.001 < p \leq 0.01$; +: $0.01 < p \leq 0.05$.

Groups	Parameters	pre		6m		12m	
		EO	EC	EO	EC	EO	EC
RG vs THA	MV	§§	§§	§§	§§	+	§
	RMS	§§	§§		++		
	AREA_NT	§§	§§	§§	§§	+	++
	PF_AP_95 -M	++	+	++	++	+	
	PF_AP_95 -F	++	+	++		+	+
	PF_ML_95						
RG vs TKA	MV -M	§§	§§		+	+	+
	MV -F	++	§	++	++	++	++
	RMS		++		+		+
	AREA_NT	§§	§§	§	§§	§§	§§
	PF_AP_95 -M	§§	++	+		+	
	PF_AP_95 -F	§	++	+		++	++
PF_ML_95							