



















Liner	Shell	Ty _{yield} Nm	NSD	T _{max} Nm	NSD	Failure interface (failure mode)
		5.6 (12%)		6.1 (13%)		Cement/liner (overcame friction)
		6.1 (12%)		6.4 (15%)		Cement/liner (overcame friction)
		6.0 (16%)		7.8 (41%)		Cement/liner (overcame friction)
		8.0 (14%)		9.3 (5%)		Cement/liner (overcame friction)
		8.2 (18%)		9.6 (23%)		Cement/liner (overcame friction)
		9.4 (14%)		51.9 (10%)		Cement/liner (deformation of spacer nubs)
		7.7 (18%)		54.6 (3%)		Cement/liner (deformation of spacer nubs)
		8.7 (14%)		62.2 (8%)		Cement/liner (deformation of spacer nubs)
		12.2 (31%)		65.7 (7%)		Cement/liner (fx of cement within liner scores)

Fig. E-1

Figs. E-1 and E-2 Results of cemented liner constructs tested in torsion and lever-out. Coefficients of variation (standard deviation/average) are in parentheses. Analysis of variance and the Tukey-Welch multiple comparison procedure were used to determine which constructs were significantly different from one another ($\alpha = 0.05$). Vertical lines within the same column indicate groups that were not significantly different (NSD) from one another. **Fig. E-1** Torsion testing. Ty_{yield} = yield torque, T_{max} = maximum torque, and fx = fracture.

















Liner	Shell	Myield	NSD	Mmax	Failure interface (failure mode)
		Nm		Nm	
		6.4 (32%)		23 (27%)	Cement/liner (minor cement damage at surface)
		16.2 (36%)		25 (26%)	Cement/liner (cement fx within liner scores, plastic deformation of liner score edges)
		18.6 (35%)		39 (35%)	Cement/liner (n=4; cement fx above liner groove), combined (n=1)
		22.9 (28%)		42 (10%)	Cement/liner (minor cement damage at surface)
		25.9 (23%)		47 (16%)	Cement/liner (cement fx above liner groove)
		45.2 (22%)		108 (20%)	Cement/liner (n=4; cement fx within or above liner grooves, deformation of spacer nubs), cement/shell (n=1)
		56.9 (19%)		114 (4%)	Cement/liner (cement fx within or above liner grooves, deformation of spacer nubs)
		67.6 (26%)		146 (10%)	Cement/liner (cement fx within liner grooves, deformation of spacer nubs)

Fig. E-2

Lever-out testing. Myield = yield moment, Mmax = maximum moment, and fx = fracture.