



GRAF'S TYPES AND DESCRIPTION DEVELOPMENTAL DYSPLASIA AND DISLOCATION OF THE HIP

Classification according to Graf	Bony roof Alpha Angle	Bony Rim area	Cartilaginous roof Beta Angle	Age	Treatment
TYPE I normal hip	good $\alpha \geq 60^\circ$	angular or blunt	covering Ia $\beta < 55^\circ$, Ib $\beta > 55^\circ$	any age	reassurance and discharge
TYPE IIa (+) developmentally immature, adequate according to age	adequate according to age $\alpha = 50-59^\circ$ (sufficiently developed according to age – see sonometer)	rounded	covering	0-12 weeks	follow up until Type I (or treatment if develops into Type IIa- or Type IIb)
TYPE IIa (-) developmentally immature, maturation deficit	deficient $\alpha = 50-59^\circ$ (insufficiently developed according to age – see sonometer)	rounded	covering	> 6-12 weeks	Treatment until Type I
TYPE IIb dysplasia, late ossification	deficient $\alpha = 50-59^\circ$	rounded	covering	> 12 weeks	Treatment
Exception: TYPE II in case of remodeling or late ossification	deficient $\alpha = 50-59^\circ$	angular (exogenous because of late ossification)	covering	any age	
TYPE IIc (critical hip) IIc stable/IIc unstable	deficient $\alpha = 43-49^\circ$	rounded	covering $\beta < 77^\circ$ (unstable: if β increases to > 77° with stress test)	any age	Treatment
TYPE D hip decentered $\beta > 77^\circ$	deficient $\alpha = 43-49^\circ$	rounded/ flat	just covering/ beginning to displace cranially $\beta > 77^\circ$ (without stress test)	any age	Treatment
TYPE IIIa dislocated hip	poor $\alpha < 43^\circ$ (angle measurement not possible if femoral head not in the standard plane)	flat	cartilage roof cranially displaced, (absence of echogenicity)	any age	Treatment
TYPE IIIb dislocated hip	poor (angle measurement not possible if femoral head not in the standard plane)	flat	cartilage roof cranially displaced, with echogenicity within the cartilaginous roof (proximal perichondrium going upwards)	any age	Treatment
TYPE IV dislocated hip	poor (angle measurement not possible if femoral head not in the standard plane)	flat	cartilage roof caudally displaced (proximal perichondrium horizontal or going downwards)	any age	Treatment