

Table 1 Elements that intervene and influence the technical movement of the spike in bádminton

Joint	Phase 1			Phase 2			Phase 3		
	movement	Muscles	contraction	movement	Muscles	contraction	movement	Muscles	contraction
Shoulder	D	abduction + extension	Middle deltoid, Supraspinatus, Latissimus dorsi	Concentric	Former rotation+ extension+ abduc.	Eccentric Concentric	Extension + rotation in + adduction	Latissimus dorsi, Teres major, Subscapularis, Pectoralis major, Pectoralis major, Latissimus dorsi, Teres major and minor, Posterior deltoid	Eccentric
	I	horizontal flexion (abduction + flexion)	Middle deltoid, Supraspinatus, Anterior deltoid, Coracobrachialis, Pectoralis major, Trapezius, Serratus major, Spine muscles.	Concentric	Rotation in. Flexion Extension	Concentric Eccentric	slight extension	Anterior deltoid, Corabrachialis, Pectoralis major.	Eccentric
Elbow	D	Flexion	Biceps brachii, Brachialis anterior, Supinator longus	Concentric	Extension	Concentric	I didn't move		
	I	slight bend	Biceps brachii, Brachialis anterior, Supinator longus.	Concentric	extension – flexion	Concentric Eccentric	flexion	Biceps brachii, Brachialis anterior, long supinator	Concentric
Doll	D	not moved			Flexion Extension	Concentric	flexion	Ulnar anterior, Palmar major and minor.	Eccentric
	I	Flexion	Ulnar anterior, Palmar major and minor.	Concentric	Extension	Concentric	Not moved		
Trunk		rotacion + extension	rotation + extension	rotation + extension	rotation + extension	Concentric	flexion	Greater and lesser oblique abdominis, rectus abdominis	Concentric
Hip	D	Extension + external rotation	Extension + external rotation	Extension + external rotation	flexion + rotation in	concentric	bending	Iliopsoas, Sartorius, Rectus abdominis, Tensor fascia lata, Gluteus maximus and minimus, Abductor magnus	concentric

Knee	I	not moved	not moved	not moved	Flexion-extension	Iliopsoas, Sartorius, Rectus abdominis, tensor fascia lata, Gluteus maximus, Biceps femoris, Semimembranosus, Semitendinosus	concentric	Extension	Gluteus maximus, Biceps femoris, Semimembranosus, Semitendinosus	concentric
	Mr	slight extension	Cuádriceps crural	Concentric	Flexion	Semimembranosus, Semitendinosus, Internal rectus, Sartorius, Biceps femoris.	Concentric	flexion	Semimembranosus, Semitendinosus, Medial rectus, Sartorius, Femoral biceps.	Concentric
	I	slight extension	Crural quadriceps	Concentric	flexion – extension	Semimembranosus, Semitendinosus, Internal rectus, Sartorius, Biceps femoris, sural twins, Popliteal, Plantar thin, Quadriceps femoris.	Concentric	flexion-extension	Crural quadriceps, Internal rectus,	Concentric
Ankle	D	extension	Triceps surae	Concentric Eccentric	Extension-flexion	Triceps surae, tibialis anterior, common extensor of the fingers, peroneus anterior.	Concentric	Flexion	Sartorius, Biceps femoris,	Concentric
	I	Flexion	Tibialis anterior, common extensor digitorum, peroneus anterior.	Concentric	flexion – extension	Triceps surae	Concentric	slight bend	Sural twins, Popliteus,	Eccentric
