Review of Surgical Anatomy

Mariana Phillips, MD. (Updated July 2015)*

SURGICAL ANATOMY		
Structure	**Location: ("Danger Zone")**	**Innervation / Result of Injury**
Main trunk of the Facial Nerve	Facial nerve exists skull at the stylomastoid foramen into parotid	Innervates: muscles of facial expression from the undersurface; protected by SMAS (Superficial Musculo-Aponeurotic System)
Temporal branch of the Facial Nerve	Marked by a line drawn from the earlobe to lateral edge of the eyebrow and a line drawn from the tragus to the highest forehead crease	Innervates: frontalis, corrugators Damage: brow ptosis
Zygomatic branch of the Facial Nerve	Nerves rest on Bichat's fat pad and are located deep to SMAS and parotid fascia; Danger zone anterior to the parotid: defined by a triangle connecting the malar eminence, posterior border of the mandibular angle, and oral commissure	Innervates: **o**rbicularis oculi, **p**rocerus, **e**levators of lip (levator labii superioris, levator labii alaqui, zygomaticus minor & major), and **n**asalis (mnemonic: **OPEN**) Damage: inability to tightly close eyelids, possible ectropion, inability to show the upper teeth
Buccal branch of the Facial Nerve	Same as above (Zygomatic branch)	Innervates: orbicularis oris, buccinator muscles Damage: trapping of food between the gums and cheeks while chewing
Marginal Mandibular branch of the Facial Nerve	Located anterior to the anterior border of masseter muscle	Innervates: depressor anguli oris, depressor labii inferioris, mentalis, risorious (draws angle of mouth laterally) Damage: inability to show the lower teeth
Greater Auricular Nerve	Danger zone: Erb's point: a perpendicular line is dropped 6 cm from the midline of the line connecting the mastoid and the angle of the jaw	Sensory nerve; Damage: numbness of inferior 2/3 of ear, lateral neck, angle of jaw Nerves emerging at Erb's point: greater auricular, lesser occipital, transverse cervical, spinal accessory nerves
Spinal Accessory Nerve (CN XI)	Emerges from the posterior aspect of SCM in the posterior triangle of the neck at Erb's point; covered only by skin and superficial cervical fascia (not the platysma)	Normally innervates trapezius Damage: winging of the scapula, inability to shrug the shoulder, difficulty abducting the arm, chronic shoulder pain

SUTURE			
Non-Absorbable	**Name brands**	**Configuration**	**Comments**
Silk	Ethicon	Braided	Mucosal surfaces because soft and pliable
Nylon	Ethilon, Dermalon, Surgilon, Neurolon	Monofilament and braided	Increased memory (ability of suture to retain package configuration) with monofilaments
Polypropylene/ Polyolefin	Prolene Surgilene	Monofilament	Best for running subcuticular (low friction) High plasticity- retains new shape once stretched
Polyester	Dacron, Mersiline, Ethibond	Braided	Second highest tensile strength; Teflon coating increases tissue reactivity: risk of granulomas
Polybutester	Novafil	Monofilament	Increased elasticity
Steel	Ethicon, Aesculap	Mono and braided	Greatest knot security
Greatest tensile strength (size dependent):	Steel > polyester > Nylon (monofilament) > Nylon (braided) > Polyprolene > Silk		
Most tissue reactivity:	Silk and cotton > Polyester coated > Polyester uncoated > Nylon > Polypropylene		
Absorbable	**Name brands**	**Configuration**	**Comments**
Surgical gut	Animal collagen	Monofilament	Chromium salts increase strength and decrease reactivity
Polyglycolic acid	Dexon	Braided	
Polyglactin	Polyglactin	Braided	High knot security (greater with braided suture)
Polydioxanone	PDS	Monofilament	Good for high tension wounds- 70% tensile strength at 2 weeks and not completely absorbed until 180 days
Polytrimethylene/ Polyglyconate	Maxon	Monofilament	Increased tensile strength like PDS but easier to handle
Poliglecaprone 25	Monocryl	Monofilament	Minimal tissue reactivity; decreased scarring
Glycomer	Biosyn	Monofilament	
Greatest tensile strength (size dependent):	*Polyglycolic acid > Polyglactin > Polydioxanone > Catgut*		
Most tissue reactivity:	*Catgut > Polyglactin> Polyglycolic acid > Poliglecaprone*		
Most tissue reactivity when ALL sutures considered:	*Catgut > Silk > Chromic catgut*		

Mariana Phillips, MD, is currently an assistant professor at the Virginia Commonwealth University in Richmond, Va.

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CHEMICAL PEELS

Peel	Components	Depth*	MOA/ Strength	Comments
Jessner's	Resorcinol, Sal acid, Lactic acid, ETOH	Very superficial	Keratolysis	Limited absorption of resorcinol In combination with TCA medium peel
TCA (trichloracetic acid)	Concentration: weight per volume	35-40% - med** >40% - deep**	Protein precipitation/ coagulation No toxicity	Frost correlates with depth of peel TCA concentration and amount applied determines depth of peel
Alpha-hydroxy acids: **- Glycolic Acid** **- Lactic Acid**	70% Glycolic acid	Very superficial Hydrophilic: water soluble	Keratinocyte discohesion and epidermolysis Peel is time dependent, frosting is not an end point, needs neutralization	The amount of free acid determines depth of peel (pH and pKa are the most important determinates); increased photosensitivity
Beta-hydroxy acids: **- Salicylic Acid**	20-30% Salicylic acid	Very superficial	Localizes to pores given lipophilic nature	Good for acne, milia, keratolysis Frost indicates peel complete
Resorcinol	Phenol derivative	Very superficial		Toxicity similar to phenol Ochronosis Anti-thyroid effect- Myxedema Methemoglobulinemia
Phenol	Phenol- component of Baker's Peel	Deep**	Paradox: dilution increases penetration; "protein precipitation" prevents extension of peel	Myocardial, glomerulonephritis, hepatic toxicity Phenol poisoning: central depression, hypotension, HA, N/V
Baker's phenol	Phenol, Croton oil Septisol (soap)	Deep**		

* Very superficial: stratum corneum and stratum granulosum; Superficial: basal layer and upper papillary dermis; Medium: through papillary dermis and upper reticular dermis; Deep: mid reticular dermis
** Antiviral prophylaxis given for medium-depth and deep peels

TOPICAL SURGICAL SCRUBS

Surgical Scrubs	Onset	Spectrum	Comments
Povidone-iodine (PVP-1)	Delayed	Broad specturm	Microbicidal; iodoinates proteins and oxidizes cell constituents
Alcohol	Most Rapid	Excellent Gram positive Excellent Gram negative	No sustained activity Flammable
Chlorhexidine	Rapid Sustained activity	Excellent Gram positive Good Gram negative	Safest in neonates and premature infants Ototoxic to middle ear Irritating to eyes (conjunctivitis and keratitis)

***Reviewed and updated July 2015 by: Alina Goldenberg, MD, Emily deGolian, MD, and Sharon Jacob, MD.**