



Practical Depth Assessment and Management

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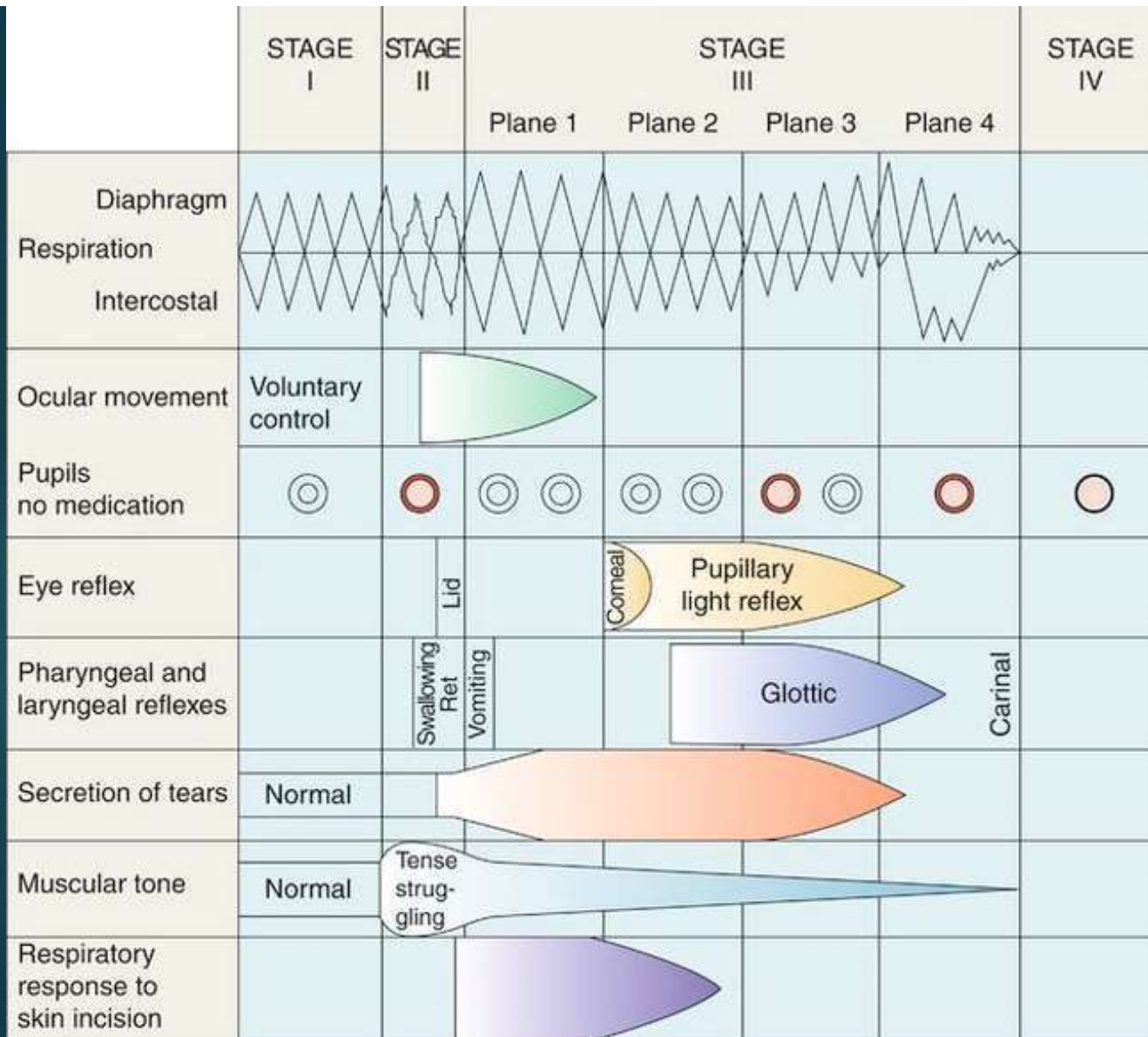
Objectives

- ▶ History behind monitoring depth/ unconsciousness
- ▶ Importance of knowing degree of unconsciousness
- ▶ Depth assessment
- ▶ Depth management

History of anesthetic monitoring

- ▶ Dr. Arthur Guedel, anesthesiologist during WWI
- ▶ He was concerned about 'anesthetic safety'
 - ▶ Inexperienced anesthesiologists easily overdosed patients
 - ▶ High rate of mortality during Soldier's anesthetic events
- ▶ He described that there were four stages of unconsciousness
 - ▶ 'Guedel classification'





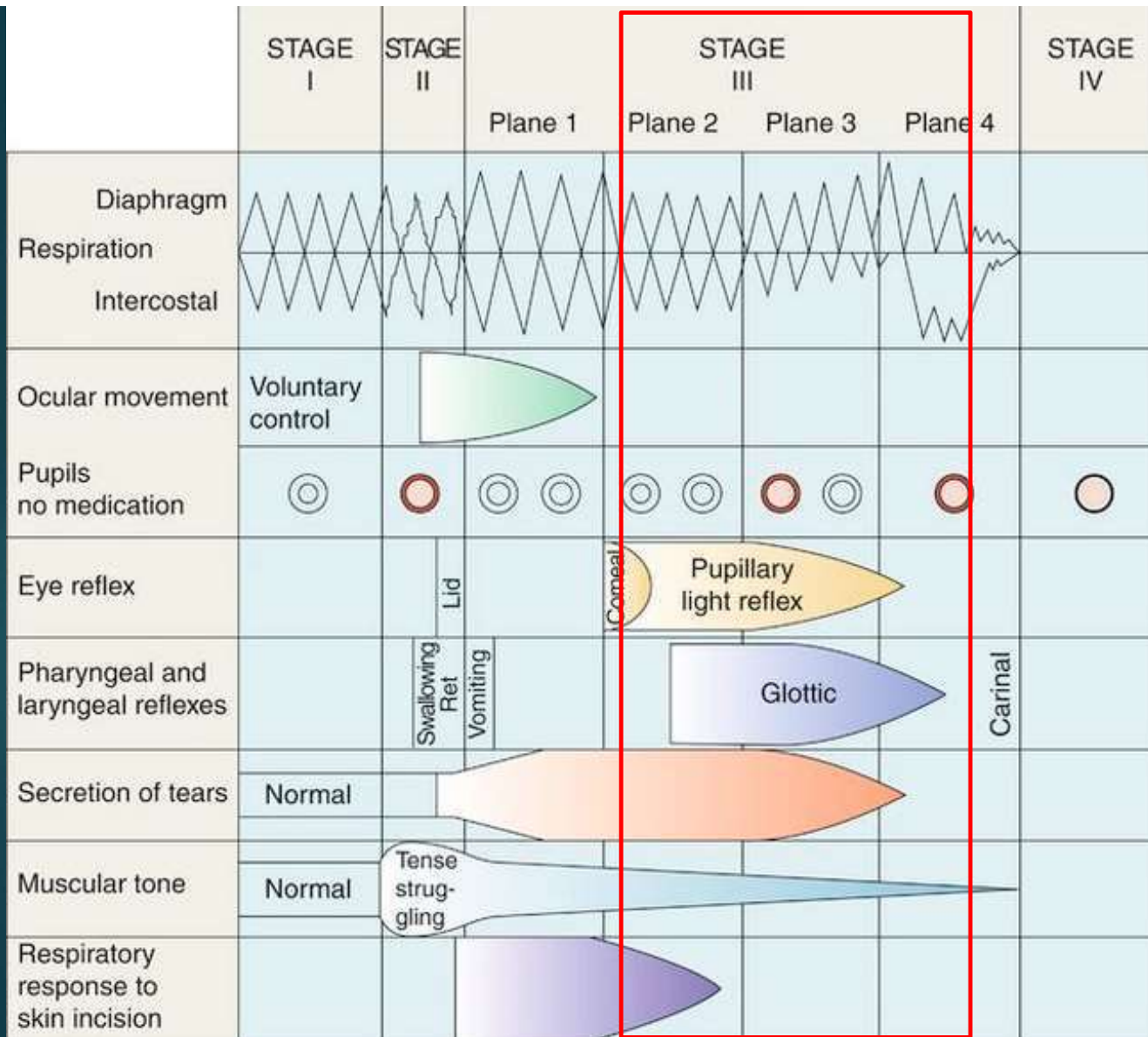
'Guedel' Classification

Repeatable trends identified for various parameters

	STAGE I	STAGE II	STAGE III				STAGE IV
			Plane 1	Plane 2	Plane 3	Plane 4	
Diaphragm Respiration Intercostal							
Ocular movement	Voluntary control						
Pupils no medication							
Eye reflex		Lid					
Pharyngeal and laryngeal reflexes		Swallowing Ret Vomiting					
Secretion of tears	Normal						
Muscular tone	Normal	Tense strug- gling					
Respiratory response to skin incision							

‘Guedel’ Classification

Not exactly the
same as animals
under isoflurane
anesthesia, but
similar



'Guedel' Classification

In general, we target:
Stage III &
Phase 2-4



Remember:

Goals of General Anesthesia

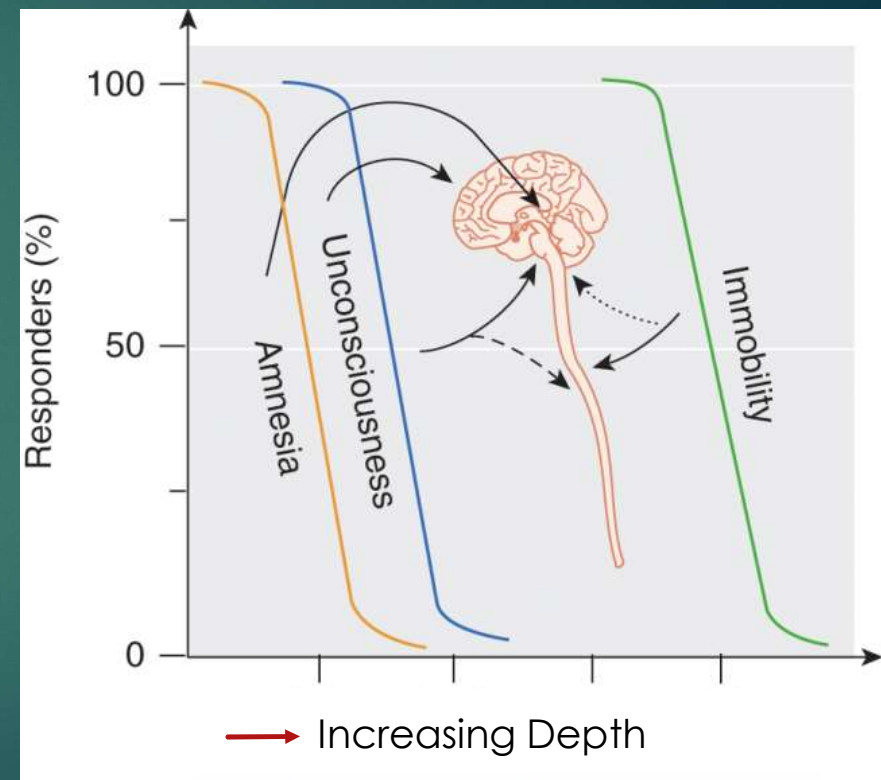
- ▶ Unconsciousness
- ▶ Muscle relaxation
- ▶ Analgesia
- ▶ Amnesia
- ▶ Cardiopulmonary stability

Why monitor level of unconsciousness?

- ▶ Increase patient safety
 - ▶ Lack awareness, pain, recall and movement
 - ▶ Minimize mortality and morbidity
- ▶ 'Anesthesia' is not benign:
 - increasing depth = increasing side-effects from inhalants

Common Misconception

- ▶ A 'light' patient does not necessarily mean awake



Depth Assessment

- ▶ Subjective
 - ▶ Palpebral reflex
 - ▶ Eye position
 - ▶ Jaw tone / muscle tone
 - ▶ Cardiorespiratory 'response' to stimulus

Stimulus Under General Anesthesia

Two types of stimulus

**Proprioceptive
(Non-painful)**



**Nociceptive
(painful)**



Palpebral Reflex

- ▶ Cranial nerves 5 (Trigeminal) & 7 (Facial)
- ▶ Light touch to medial and lateral canthus
 - ▶ False palpebral reflex
 - ▶ Check both sides – can be different
 - ▶ Weight on orbit due to positioning
 - ▶ Asymmetric effects of anesthetics on brainstem



Positive Palpebral Reflex

- ▶ Patient is 'light'
 - ▶ Does not mean you need to make a change 'right then'
 - ▶ What is the patient having done?
 - ▶ How long has it been on 'circuit'?
 - ▶ How long since last analgesic/sedative?

*Consider entire context, trying to respond appropriately, instead of reacting

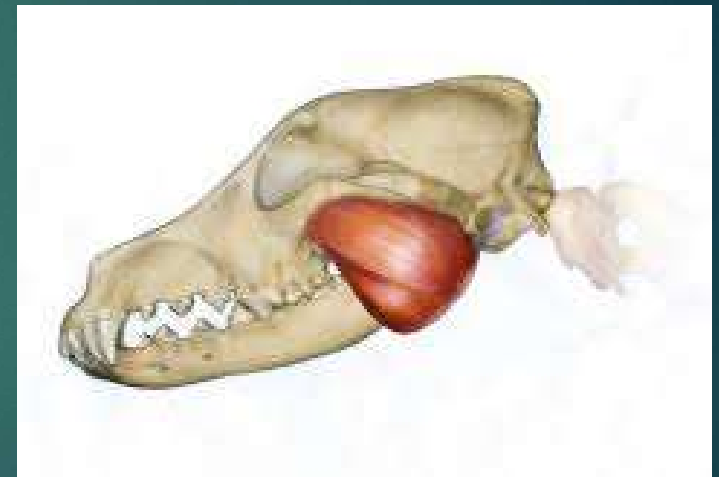
Eye position

- ▶ Cranial nerve III (Oculomotor) IV- (Trochlear) and VI- (Abducens)
- ▶ Ventromedial is what we aim for
- ▶ Central eye position means one of two things
 1. Too light
 2. Too deep
- *Huge range of depth in between
- ▶ How to assess
 - ▶ Open both upper and lower lids
 - ▶ Patient in dorsal recumbency



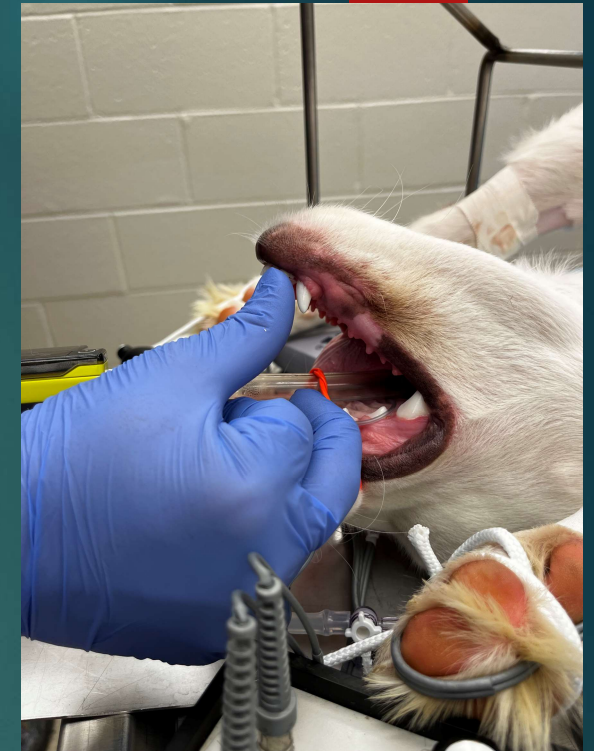
Jaw tone

- ▶ Loss of muscle tone from anesthetic agents
- ▶ Assessing the amount of tone the animal has
 - ▶ Medium-large patients = use two hands
 - ▶ Small dogs and cats = use one hand
- ▶ **CHANGE in resistance** at half to 2/3 of the way is the goal
- ▶ No resistance = animal is too deep
- ▶ Young animals (and cats) = little-to-no resistance at 'adequate' planes of unconsciousness
- ▶ Resistance changes sec-to-sec/min-to/min





Yes

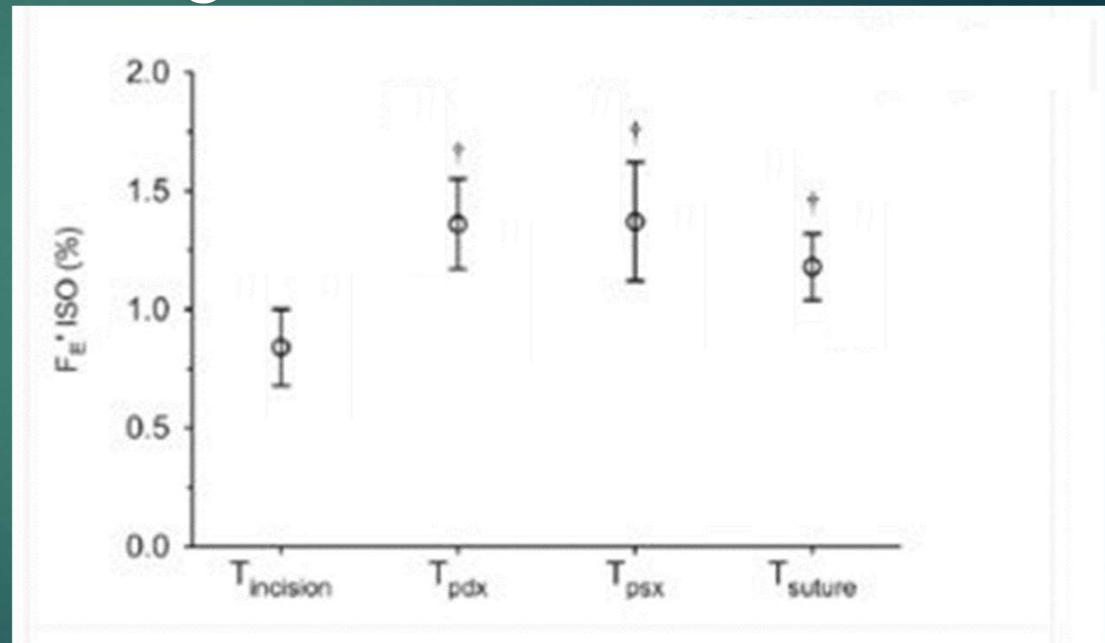


only small patients

Assessing Jaw tone

Depth management

- ▶ Requires continuous monitoring min-to-min
 - ▶ Anesthetic requirements throughout the event



Making depth adjustments

- ▶ 'Sudden' (e.g., 20% +) change in cardiopulmonary parameters, from pre-stimulus baseline
 - consider turning up
 - ▶ What is being done to the patient
 - ▶ Take into consideration patient's analgesic 'history'
- ▶ No response to surgical stimulus
 - ▶ Not necessarily 'too deep'
 - ▶ Make small adjustments

Summary

- ▶ We monitor to increase patient safety; thereby, reduce not only mortality but morbidity too
- ▶ Monitoring entails both subjective observational and objective monitoring
- ▶ Use multiple parameters to inform depth management



**“There are no safe anesthetic agents:
there are no safe anesthetic procedures:
there are only safe anesthesiologists”
- Dr. Robert M. Smith**

Questions?