

## Standing Sedation and Restraint in the Horse

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Standing sedation in horses has many advantages when compared to general anesthesia:

- General anesthesia has high morbidity/mortality
- Less challenging
  - Less personnel required
  - Less equipment
  - No need to move and position the anesthetized horse
- Less cardiovascular depression
- Less respiratory depression
- Avoid recumbency
- Less expensive
- Avoid recovery and its risks

Different methods of physical restraint can be used along with chemical restraint:

- Halters and lead ropes
  - Use nylon halters
  - Avoid expensive leather halters
  - NEVER tie a horse during standing procedures, this increases the risk of injuries to the horse should it panic
- Twitches
  - Apply right before the procedure, since the effect is attenuated with time
  - Causes pain and distracts the horse
  - Causes release of endorphins
  - DON'T overtighten the chain (it can cause lacerations on upper lip)
- Stocks
  - They only confine the horse
  - The horse can still jump over the front and sides
  - The horse can still jump up and kick over the back door
  - If ropes are used, use 'quick release' slip knots in case the horse panics
- More tips!
  - Use blindfold (can use towel)
  - Put cotton in the ears if the horse tolerates it
  - Humane twitch can be used. The only advantage is that they are self-retaining, but they are not more humane

The following factors should be taken in consideration when choosing sedation drugs:

- Signalment
  - Breed
    - Draft horses more sensitive to sedative drugs
    - Hot-blooded, excited, and fearful horses (Warmblood, Arabs, Thoroughbred) less sensitive to sedative drugs
  - Gender
    - Stallions
      - High risks for injuries to personnel and to the horse
      - Risk of paraphimosis when using acepromazine
    - Pregnant mares
      - Xylazine increases uterine tone (detomidine may be better)
      - Risk of abortion
        - Greater in old mares ( $\geq 15$  years) and during the first 40 days of gestation
- History
  - Neurologic and orthopedic conditions can worsen with sedation
  - Previous adverse reactions to any drugs

- Previous anesthetic episodes
- HYPP
- Current drugs
- Physical exam
  - Respiratory and cardiovascular systems
    - Mucous membranes
    - Heart rate
    - Pulse
    - Auscultation
    - Nasal discharge

Equipment needed when planning standing sedation:

- IV catheter, clipper, prep kit, lidocaine
- Physical restraint
  - Halter, lead rope, twitch....
- Drugs and syringes
- IV pole, IV set for CRIs, saline 500 ml bag if planning on using a CRI

Recommendations for chemical restraint for standing procedures:

- Don't give 'too much' drug. You can always give more later
- Minimal ataxia is desirable. Ideally the horse should stand without any support
- The protocol should produce sedation and analgesia if the procedure is painful
- Combine with local blocks if possible
- Use standing sedation for short procedures (less than 60 minutes)
- Combinations of drugs are more effective
  - Alpha-2 agonists + acepromazine
  - Alpha-2 agonists + opioids
- Avoid benzodiazepines
  - No analgesia or sedation
  - Excellent muscle relaxation, which will increase the degree of ataxia

## **Drugs and protocols for standing sedation**

### Alpha-2 agonists

- Xylazine
- Romifidine
- Detomidine

Clinical use:

- Good sedation
  - Better when combine with an opioid (i.e. butorphanol)
  - The horse can still kick, especially if used alone
- Ataxia
  - The horse will lower the head, which can cause facial edema due to venous congestion. This may lead to respiratory compromise (use headstand for long procedures). The head should be placed above the level of the heart
- Romifidine might produce less ataxia and the head does not drop as low when compared to xylazine
  - Better for standing procedures on the head (ophthalmic and dental procedures)
- They cause hypertension, bradycardia, decreased cardiac output (longer with detomidine)
- They cause diuresis, hyperglycemia, decreased GI motility
- Reversal agents
  - Tolazoline and yohimbine (atipamezole)

<b>IV</b>	<b>Dose (mg/kg)</b>	<b>Onset (min)</b>	<b>Duration (min)</b>	<b>CRI (to effect)</b>
Xylazine	0.4-1	5	30-40	0.7 mg/kg/h
Detomidine	0.005-0.01	10	60-120	0.5 µg/kg/min for 15 min 0.3 µg/kg/min for next 15 min 0.1 µg/kg/min for next 15 min
Romifidine	0.08-0.1	5	30-40	0.003 mg/kg/h

### Opioids

- Butorphanol
- Morphine

### Clinical use:

- Can cause excitement and restlessness in adult, non-painful healthy horses
  - Avoid high doses
  - Use after the horse has been sedated with an alpha-2
- Minimal cardiovascular effects
- Decreased GI motility

	<b>Dose (mg/kg)</b>	<b>Duration (h)</b>	<b>Comments</b>
Morphine	0.1	2-4	IM, only if sedated (can cause excitement in healthy non-sedated horses), good analgesia, decreases GI motility
Butorphanol	0.01-0.02	1	IV, no sedation by itself (but increases xylazine sedation), weak analgesia, can cause twitching and tremors

### Acepromazine

- 0.01-0.04 mg/kg IV or IM
- Mild sedation
- Minimal respiratory depression
- No analgesia
- Complications
  - Hypotension
  - Paraphimosis

### Suggested protocols:

- Xylazine 0.22-0.44 mg/kg
- Acepromazine 0.02 mg/kg
  
- Xylazine 0.22-0.44 mg/kg
- Butorphanol 0.02-0.04 mg/kg
  
- Xylazine 0.22-0.44 mg/kg
- Morphine 0.1 mg/kg (IM)
  
- Detomidine 0.01-0.02 mg/kg
- Butorphanol 0.02-0.04 mg/kg

- If using a CRI protocol:
  - Detomidine bolus 6 µg/kg
  - Butorphanol bolus 0.02 mg/kg
  - Followed by detomidine:
    - 0.5 µg/kg/min for 15 min
    - 0.3 µg/kg/min after the first 15 min, continue for 15 min
    - 0.1 µg/kg/min after the previous 15 min, continue until the end of procedure
  - Butorphanol can be added as CRI at 0.02 mg/kg/hr
  
- Example for a 500 kg horse
  - 0.5 µg/kg/min → 15 mg/hr
  - Place 15 mg of detomidine (1.5 ml using 10 mg/ml vial) in a saline bag (500 ml) with a 10 drops/ml set
  - Start at 1.4 drops/sec → 3 drops/2 sec (then reduce following the protocol)