

By Marian Graves Little, DVM, Technical Veterinarian, Medical Affairs, American Regent, Inc., manufacturer of Adequan® i.m. [polysulfated glycosaminoglycan]. Some content may reflect medical opinion.

It's not a question of if DJD will occur, but when.

Throughout a horse's lifetime, joints bend, flex, bear weight and absorb shock in varying degrees. Every movement, ride or event puts "wear and tear" on the joints, reflected by the high prevalence of Degenerative Joint Disease (DJD) across the equine population.² DJD is defined as "A group of disorders characterized by a common end stage in which progressive deterioration of the articular cartilage is accompanied by changes in bone and soft tissues of the joint."² **Regardless of age or discipline, DJD can occur within any joint that consistently undergoes wear and tear, known as "use trauma".² This is an important reminder that joint disease can affect horses of every age and lifestyle - from top competitors and weekend warriors to backyard companions. Or, as one leading equine veterinarian so aptly put it, "If you have a horse, you have an athlete."**

Extend the patient's "mobility span" not just life span.³

Through every life stage of horses, different management strategies may be necessary to maintain soundness. As horses are living longer, veterinarians are tasked with helping maintain quality of life.⁴ Since mobility is a vital component to quality of life for every equine patient, detecting problems early and prescribing prompt treatment when disease or injury occurs is key to maximizing and maintaining healthy joints over the horse's life span or career. Put another way, a proactive approach to diagnosis and treatment can help extend a horse's mobility span.

DJD RISKS THROUGH THE YEARS

EARLY RISKS	MATURE RISKS	SENIOR RISKS
<ul style="list-style-type: none"> • Young horses may develop lameness prematurely from conformational abnormalities which can greatly influence the degree of wear and tear that a maturing joint undergoes. • These abnormalities can greatly alter forces applied to joints - and can potentially lead to joint instability, injury, and DJD. • In young foals and growing horses, conformation abnormalities should be addressed as early as possible. • The mature equine athlete that is performing well has likely adapted to any conformational issues that exist. • Cutting, reining and gaited horses put significant stress on hocks and stifles early in life - locations where DJD first develops. <p>Focus on nutrition, balanced farriery, adequate training and muscle development.</p>	<ul style="list-style-type: none"> • In healthy aging horses, lameness is the #1 concern identified by owners and veterinarians.³ • Lameness is the #1 reason for loss of use and death.³ • DJD is a common problem that affects the career longevity of performance horses. • Mature performance horses may experience physical changes resulting in increased risk of injury or exacerbation of chronic injury. • Clients and trainers should proactively manage joint health in anticipation of senior years. <p>Focus on avoiding injury, preserving joint health under 'wear and tear'.</p>	<ul style="list-style-type: none"> • A common cause of DJD in aged horses is osteoarthritis, or end-stage DJD. • Older hunters or dressage horses will commonly develop front limb lameness from DJD, such as in the coffin or fetlock joints. • Several factors likely contribute to the loss of tendon and ligament resiliency in aged horses, such as impaired regenerative capacity, decreased metabolic efficiency and accumulation of products of lifelong wear and tear.³ > A 2018 study found an association between suspensory ligament degeneration and the age-related disease Pituitary pars intermedia dysfunction (PPID) in aged horses.⁵ <p>Focus on preserving mobility, detection of underlying medical problems.</p>

There are no known contraindications to the use of Adequan i.m. and no age or breed restrictions. **PRECAUTIONS:** The safe use of Adequan i.m. in horses used for breeding, during pregnancy or in lactating mares has not been evaluated.



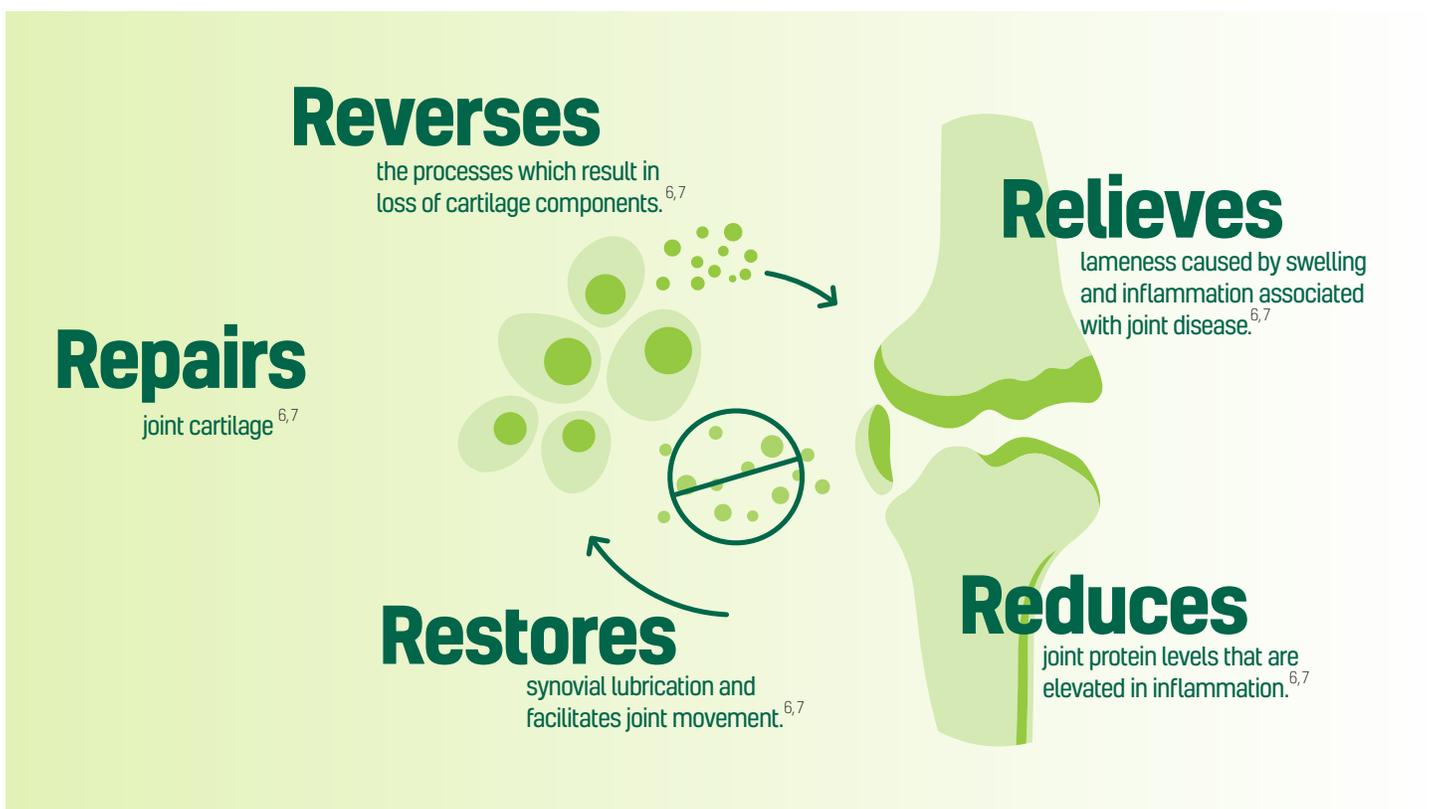
Start early. Stay vigilant.

The onset and progression of Degenerative Joint Disease results in the loss of cartilage components, **so early intervention is important**. Once diagnosis is made, develop a treatment plan focused on inhibiting the destructive processes of DJD in the beginning stages - before mobility is compromised.

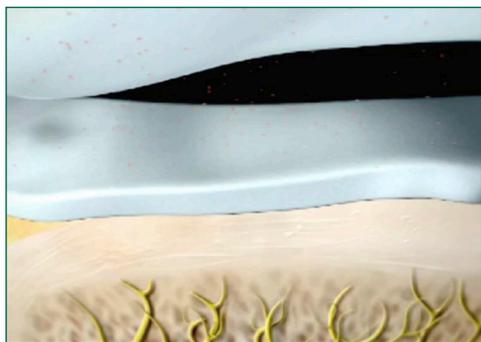
INDICATIONS: Adequan® i.m. (polysulfated glycosaminoglycan) is the only FDA-Approved equine PSGAG recommended for the intramuscular treatment of non-infectious degenerative and/or traumatic joint dysfunction and associated lameness of the carpal and hock joints in horses.⁶

Please see accompanying Full Prescribing Information on back cover.

Adequan has been proven to work in multiple ways to maintain joint function:^{6,7}

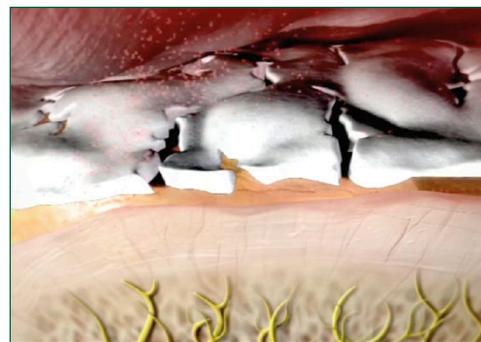


Inhibits enzymes that attack cartilage and synovial fluid.^{6,7}



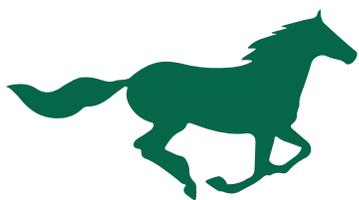
Healthy Cartilage

Only Adequan i.m. acts as a potent enzyme inhibitor to prevent and reverse the enzyme-mediated loss of joint cartilage that occurs in DJD, which if left unchecked, results in irreversible changes to the joint. Adequan also reduces synovial fluid protein levels that are elevated in inflammation, and increases hyaluronic acid concentration in affected joints.



Degraded Cartilage

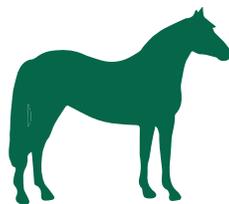
How Adequan can help extend a horse's mobility span:



Practice with it.

Make mobility a "vital sign" at every well check and examination

- Look for clinical signs of DJD
- Ask the owner about any changes that may indicate onset of a joint problem



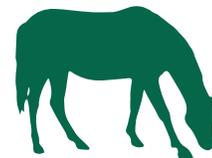
Start with it.

At early signs of DJD, prescribe Adequan i.m. at the approved 500 mg dose:

1 injection, every **4** days, **7** treatments [Total of 28 days]

Be proactive with it.

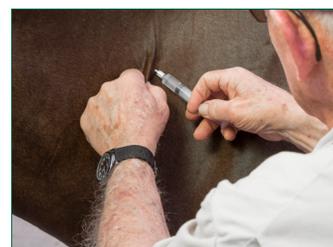
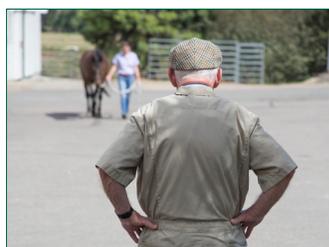
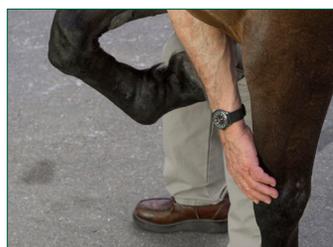
- Continue monitoring the horse's joint health and mobility.
- Educate clients on early signs of joint problems



Stay with it.

Repeat the **1-4-7** series as needed upon recurrence of clinical signs to help keep joints working and the horse performing.

CAUTION: Federal law restricts this drug to use by or on the order of a licensed veterinarian.



Start with collaboration. Stay with it.

Whether managing a two-year old in training or a geriatric companion, proactive collaboration at all life stages between veterinarians, owners, and trainers in identifying and managing DJD is pivotal to healthy longevity. When you start with and stay with Adequan, horses may enjoy greater mobility over a lifetime.^{1,2,6}

Discover if Adequan is the right choice for your patients.

INDICATIONS

Adequan® i.m. [polysulfated glycosaminoglycan] is recommended for the intramuscular treatment of non-infectious degenerative and/or traumatic joint dysfunction and associated lameness of the carpal and hock joints in horses.

IMPORTANT SAFETY INFORMATION

There are no known contraindications to the use of intramuscular Polysulfated Glycosaminoglycan. Studies have not been conducted to establish safety in breeding horses. **WARNING:** Do not use in horses intended for human consumption. Not for use in humans. Keep this and all medications out of the reach of children. **CAUTION:** Federal law restricts this drug to use by or on the order of a licensed veterinarian.

Please see accompanying Full Prescribing Information on back cover.



Adequan® i.m. Single-Dose

Brand of Polysulfated Glycosaminoglycan (PSGAG) Solution 500 mg/5 mL For Intramuscular Use In Horses

CAUTION: Federal law restricts this drug to use by or on the order of a licensed veterinarian.

DESCRIPTION: Each 5 milliliters of Adequan® i.m. contains 500 mg of Polysulfated Glycosaminoglycan and Water for Injection q.s. Sodium Hydroxide and/or Hydrochloric Acid added when necessary to adjust pH. Sodium Chloride may be added to adjust tonicity.

PHARMACOLOGY: Polysulfated Glycosaminoglycan is chemically similar to the glycosaminoglycans in articular cartilage matrix. PSGAG is a potent proteolytic enzyme inhibitor and diminishes or reverses the pathologic processes of traumatic or degenerative joint disease which result in a net loss of cartilage matrix components. PSGAG improves joint function by reducing synovial fluid protein levels and increasing synovial fluid hyaluronic acid concentration in traumatized equine carpal and hock joints.

INDICATIONS: Adequan® i.m. is recommended for the intramuscular treatment of non-infectious degenerative and/or traumatic joint dysfunction and associated lameness of the carpal and hock joints in horses.

DOSAGE AND ADMINISTRATION: The recommended dose of Adequan® i.m. in horses is 500 mg every 4 days for 28 days intramuscularly. The injection site must be thoroughly cleansed prior to injection. Do not mix Adequan® i.m. with other drugs or solvents.

CONTRAINDICATIONS: There are no known contraindications to the use of intramuscular Polysulfated Glycosaminoglycan.

WARNINGS: Do not use in horses intended for human consumption. Not for use in humans. Keep this and all medications out of the reach of children.

PRECAUTIONS: The safe use of Adequan® i.m. in horses used for breeding purposes, during pregnancy, or in lactating mares has not been evaluated.

ANIMAL SAFETY: Toxicity studies were conducted in horses. Doses as high as 2,500 mg were administered intramuscularly to 6 horses twice a week for 12 weeks. This dosage is 5 times the recommended dosage and 3 times the recommended therapeutic regimen. Clinical observations revealed no soreness or swelling at the injection site or in the affected joint. No animal had any clinical or laboratory evidence of toxicity.

STORAGE CONDITIONS: Store at 20°-25°C (68°-77°F); excursions permitted to 15°-30°C (59°-86°F) [See USP Controlled Room Temperature]. Discard unused portion. Dispose of spent needles in accordance with all federal, state and local environmental laws.

HOW SUPPLIED: Adequan® i.m. solution, 500 mg/5 mL is available in 5 mL glass vials, packaged in boxes of 7.

LUITPOLD PHARMACEUTICALS, INC. Animal Health Division
Shirley, NY 11967, [631] 924-4000, 800-458-0163, Made in U.S.A.

NADA #140-901, Approved by FDA
IN 99501, Rev. 10/08
MG #7560

1. Kim DY, Taylor HW, Moore RM, Paulsen DB, Cho DY. Articular chondrocyte apoptosis in equine osteoarthritis. *The Veterinary Journal* 2003; 166: 52-57.
2. McIlwraith CW, Frisbie DD, Kawcak CE, van Weeren PR. *Joint Disease in the Horse*. St. Louis, MO: Elsevier, 2016; 33-48.
3. McFarlane D. "How to Establish a HealthCare Program for the Aging Horse in Equine Practice," *AAEP Proceedings*, 62: 2016.
4. USDA. *Equine 2015: "Changes in the U.S. Equine Industry, 1998-2015"* USDA-APHIS-VS-CEAH-NAHMS. Fort Collins, CO #723.0517.
5. Hofberger SC, Gauff F, Thaller D, Morgan R, Keen JA, Licka TF. Assessment of tissue-specific cortisol activity with regard to degeneration of the suspensory ligaments in horses with pituitary pars intermedia dysfunction. *American J Vet R* 2018; 79: 199-210.
6. Adequan® i.m. [package insert]. Shirley, NY: Luitpold Animal Health; 2008; 2017.
7. Burba DJ, Collier MA, Default LE, Hanson-Painton O, Thompson HC, Holder CL: *In vivo* kinetic study on uptake and distribution of intramuscular tritium-labeled polysulfated glycosaminoglycan in equine body fluid compartments and articular cartilage in an osteochondral defect model. *The Journal of Equine Veterinary Science* 1993; 696-703.



Adequan® i.m. Multi-Dose

Brand of Polysulfated Glycosaminoglycan (PSGAG) Solution 100 mg/mL in a 50 mL Preserved Multi-Dose Vial For Intramuscular Use In Horses Only. Not for Intra-Articular Use.

CAUTION: Federal law restricts this drug to use by or on the order of a licensed veterinarian.

DESCRIPTION: Each mL contains Polysulfated Glycosaminoglycan 100 mg, Benzyl Alcohol 0.9% v/v as a preservative, and Water for Injection q.s. Sodium Hydroxide and/or Hydrochloric Acid added when necessary to adjust pH. The solution is clear, colorless to slightly yellow.

PHARMACOLOGY: Polysulfated Glycosaminoglycan is chemically similar to the glycosaminoglycans in articular cartilage matrix. PSGAG is a potent proteolytic enzyme inhibitor and diminishes or reverses the pathologic processes of traumatic or degenerative joint disease which result in a net loss of cartilage matrix components. PSGAG improves joint function by reducing synovial fluid protein levels and increasing synovial fluid hyaluronic acid concentration in traumatized equine carpal and hock joints.

INDICATIONS: Adequan® i.m. Multi-Dose is recommended for the intramuscular treatment of non-infectious degenerative and/or traumatic joint dysfunction and associated lameness of the carpal and hock joints in horses.

DOSAGE AND ADMINISTRATION: Practice aseptic techniques in withdrawing each dose to decrease the possibility of post-injection bacterial infections. Adequately clean and disinfect the stopper prior to entry with a sterile needle and syringe. Use only sterile needles, and use each needle only once.

The vial stopper may be punctured a maximum of 10 times.

The recommended dose of Adequan® i.m. Multi-Dose in horses is 500 mg every 4 days for 28 days intramuscularly. The injection site must be thoroughly cleansed prior to injection. Do not mix Adequan® i.m. Multi-Dose with other drugs or solvents.

CONTRAINDICATIONS: There are no known contraindications to the use of intramuscular Polysulfated Glycosaminoglycan.

WARNINGS: Do not use in horses intended for human consumption. Not for use in humans. Keep this and all medications out of the reach of children.

PRECAUTIONS: The safe use of Adequan® i.m. Multi-Dose in horses used for breeding purposes, during pregnancy, or in lactating mares has not been evaluated.

SAFETY AND EFFICACY: Safety and efficacy studies utilizing Adequan® i.m. Multi-Dose were not performed. Adequan® i.m. Multi-Dose was approved based on the conclusion that the safety and effectiveness of Adequan® i.m. Multi-Dose will not differ from that demonstrated for the original formulation of Adequan® i.m.

ANIMAL SAFETY: Animal Safety studies utilizing Adequan® i.m. Multi-Dose were not performed. Safety studies were conducted in horses using the single dose formulation. Doses as high as 2,500 mg were administered intramuscularly to 6 horses twice a week for 12 weeks. This dosage is 5 times the recommended dosage and 3 times the recommended therapeutic regimen. Clinical observations revealed no soreness or swelling at the injection site or in the affected joint. No animal had any clinical or laboratory evidence of toxicity.

STORAGE CONDITIONS: Store at 20°-25°C (68°-77°F); excursions permitted to 15°-30°C (59°-86°F) [See USP Controlled Room Temperature]. Avoid prolonged exposure to temperatures ≥ 40°C [104°F].

Use within 28 days of first puncture and puncture a maximum of 10 times. Dispose of spent needles in accordance with all federal, state and local environmental laws.

HOW SUPPLIED: Adequan® i.m. Multi-Dose solution, 100 mg/mL is available in a 50 mL glass vial, packaged in boxes of 1.

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