Review of the Economic Impact of Osteoarthritis and Oral Joint-Health Supplements in Horses

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Oral joint-health supplements (OJHSs) are a popular adjunct therapy for osteoarthritis, but only 11% of OJHSs are purchased from veterinarians. Considering the safety and quality concerns surrounding OJHSs in conjunction with our current economic position, veterinarians are encouraged to identify, recommend, and sell OJHSs, to osteoarthritis-affected and at-risk horses. Authors’ addresses: Rolling Thunder Scientific, 34 Lasby Lane, Acton, Ontario, Canada L7J 2W9 (Oke); and Gail Holmes Equine Orthopaedic Research Center, Colorado State University, Fort Collins, Colorado 80523 (McIlwraith); e-mail: wayne.mcilwraith@colostate.edu. *Presenting author; †corresponding author. © 2010 AAEP.

1. Introduction
Osteoarthritis (OA) is the single most common cause of lameness in horses.1 Indeed, approximately 60% of lameness problems in horses are related to OA.2 The U.S. horse population is currently estimated to be 7.3 million,3 which means that millions of horses currently have this debilitating, performance-limiting musculoskeletal condition. There is no cure for OA. Instead, a multimodal treatment approach is advocated for the management of OA.4 In horses, this multimodal treatment approach could involve the use of one or more of the following:

- non-steroidal anti-inflammatory drugs (NSAIDs), both IV and topical,5a
- intra-articular corticosteroids,6,7bc
- intra-articular hyaluronic acid,8
- intra-articular (but not IM) polysulfated glycosaminoglycans,8,9d
- avocado-soybean unsaponifiables (ASU),10
- interleukin receptor antagonist protein (IRAP I and IRAP II),11 and
- extracorporeal shockwave therapy.9

Dietary modification (omega-3 fatty acids) and nutritional supplements such as glucosamine, chondroitin sulfate, and methylsulfonylmethane (MSM) are also advocated for OA. Although some studies have been performed supporting a select few equine nutritional studies, in general, a dearth of data exists, supporting the use of most commercially available supplements.12e Nonetheless, the high prevalence of OA in combination with the lack of a definitive cure for OA have likely contributed to the popularity of oral joint-health supplements (OJHSs) among owners, veterinarians, and trainers alike. OJHSs, according to recent market surveys, are the most popular type of nutritional supplement for horses.13 OJHSs account for approximately one-third (34%) of all horse supplement sales (Fig. 1). Over one-half of all pet
supplements sold in the United States are for equine consumption, and 49% of all horse owners purchase and administer some sort of dietary supplement to their horses. In a study of feeding practices in 3-day event horses, the authors found that horses were supplemented with an average of four different oral products daily, including electrolytes, plain salt, and OJHSs.14

Given the high prevalence of OA and horse owners’ documented willingness to purchase OJHSs, the purpose of this review is to relay pertinent information regarding the economic impact of OA and nutritional supplements marketed to support joint health (i.e., OJHSs). The information in this manuscript is anticipated to benefit equine practitioners by providing the necessary tools to select and market quality OJHSs to clients with either OA-affected horses or those at-risk for developing OA. This will not only improve the quality of life of our client’s horses but also improve profitability for veterinary practices.

2. The Economic Impact of OA

In human medicine, OA is a leading cause of morbidity and one of the top causes of disability worldwide.15,16 The economic impact of OA has been assessed in various studies. In 2005, a Canadian group assessed both direct and indirect costs attributable to OA.15 Direct costs are those paid to the health-care system and out-of-pocket expenditures paid by the patient for prescriptions, medical devices, transportation, and home adaptations. Indirect costs include lost income or leisure time by the patient because of disease and informal care provided by unpaid caregivers for such activities as assistance with personal care and household and yard chores.

Of the 1,378 patients included in the study, the average annual cost per patient was approximately $10,000 (U.S. dollars). One-fifth of these costs were attributable to direct costs, whereas the remaining 80% of OA-related costs were indirect. Indirect costs related to OA are, therefore, important and as pointed out by the study authors, must be considered, because failure to incorporate caregiver costs “undervalues the cost of illness.”15

In equine practice, the direct costs of OA include diagnostic and treatment fees charged by veterinarians. Indirect costs include loss of employed or leisure time spent caring for the horse by the owner (or primary caregiver), loss of income of a performance horse when incapable of performance because of OA, and increased work by the owner to care for their horse with OA. If veterinary medicine is similar to human medicine, then the true costs of OA, including both direct and indirect costs, in equine practice can be estimated. For example, if a veterinarian examines a horse for mild to moderate persistent lameness ($50), radiographs two joints ($250), and treats with intra-articular medication ($250), the direct medical costs are approximately $550 (costs estimated using Veterinary Fee Reference17). Additional direct medical costs could include NSAID administration ($20 for an IV dose and $2.50/day for oral administration) and the owner administering an OJHS ($2.00/day). In 1 yr, the direct medical costs could amount to approximately $3,000. If one considers indirect medical expenses, the cost of this horse could be substantially higher—perhaps as high as $15,000/yr.

3. The Nutritional-Supplement Industry

The veterinary nutritional-supplement industry has grown almost exponentially over the past decade, and market surveys suggest that it will continue to do so until at least 2012. Total retail sales of veterinary nutritional supplements in 2007 exceeded 1.2 billion U.S. dollars and are anticipated to reach almost 2 billion U.S. dollars over the next few years (Fig. 2).13

At present, equine veterinarians benefit little from this windfall, because only 11% of equine dietary supplements are purchased from veterinarians. Instead, most equine supplements are purchased from tack shops/saddlaries (32%), online

![Fig. 1. Equine nutritional supplement sales in the United States based on function.13](image)

![Fig. 2. Actual (2003–2007) and anticipated (2008–2012) sales of pet supplements in the United States.13](image)
or through mail order (31%), and from feed/seed stores.13

The fact that equine veterinarians are missing a proverbial golden opportunity is not to be taken lightly. According to Andrew Clark18 from Haggard Equine Medical Institute in Lexington, KY, current economic trends in equine practice are weak. Although Western practices in Texas and Oklahoma have been less affected by the weak economy than English and Thoroughbred practices, the profitability (profit margins) of the average equine practitioner has decreased markedly from approximately 30% to 15% or less.18 In the same 2009 issue of the Veterinary Clinics of North America Equine Edition, Magnus19 pointed out that equine veterinarians are provided few opportunities to develop the necessary business tools during their education to ensure financial success.

Considering the continued economic growth of the nutritional-supplement industry combined with the general lack of growth in equine practices in the United States, prudent selection and marketing of high-quality OJHSs for OA are anticipated to benefit not only equine practitioners but also the clients and their horses, given the preponderance of poor-quality and potentially detrimental supplements commercially available to unsuspecting consumers. Moreover, OJHSs are not only indicated for horses already diagnosed with OA but also those with a history of trauma, surgery, or navicular disease and prophylactically before any sort of musculoskeletal injury. These indications, contraindications, and relevant safety information are relayed here.

4. Use, Quality, and Safety of OJHSs

Indications

As previously reviewed by the authors,12 published clinical trials support the use of glucosamine, chondroitin sulfate, and/or ASU in horses with OA20,21 and navicular syndrome22 and post-surgically/postraumatically.10,23 Evidence in dogs suggests that OJHSs may also be beneficial when administered prophylactically.24

Additional non-subjective, randomized controlled clinical trials evaluating the efficacy of equine OJHSs with adequate power to confirm or refute the clinical indications of these supplements are needed. In the meantime, practitioners are encouraged to take an evidence-based medical approach to assess existing and future in vivo studies. A level-of-evidence rating can be assigned to all clinical trials to concisely and easily evaluate the study’s overall quality and therefore, critically assess the study’s take-home message.25 Wright25 describes studies from Level I (randomized, controlled studies) to Level IV (case series). In general, controlled clinical trials, prospective studies, and randomized studies are superior to non-controlled, retrospective, and non-randomized trials.

Contraindications

Despite the high lethal dose (LD)50 values associated with many ingredients included in OJHSs, potential contraindications associated with the use of OJHSs do exist and are worth considering when recommending nutritional supplements. Hypersensitivities and gastrointestinal upset after administration are theoretically possible, but no published studies have documented these or other adverse events and specific commercially available OJHSs have been proven safe in horses.26,27 In contrast, drug-herb interactions can and do occur. Yucca (Yucca schidigera) may accelerate NSAID metabolism, ginseng (Panax ginseng, Panax quinquefolius, and Eleutherococcus senticosus) may interfere with drugs that are metabolized by the liver and could potentiate diuretics, flaxseed (Linum usitatissimum) may alter absorption of other drugs, and echinacea (E. purpurea, E. angustifolia, and E. pallida) may interact with drugs metabolized by the liver.28–32

Poor-Quality Supplements

As described by various research groups, poor-quality supplements are widely available to unsuspecting consumers, including veterinarians.33–37 The preponderance of poor-quality supplements, therefore, makes recommending one or more products a clinical challenge. The term poor product quality refers to supplements that:

- do not contain the type or amount of ingredient listed on the manufacturer-generated product label,
- recommend or result in administration of subtherapeutic doses of the nutritional supplement(s), and
- are potentially contaminated by harmful components (e.g., heavy metals or pesticides) or other nutritional supplements because of contaminated equipment during production.

5. Integrating Quality OJHSs into Your Practice: The ACCLAIM System

Nutritional supplements likely to be safe, effective, and produced in a quality manner can be selected, stocked, and recommended to clients using the seven-step ACCLAIM system (devised by S.L.O.). Virtually all of the information needed to adequately assess an OJHS (or other type of nutritional supplement) can be found on the manufacturer’s product label (Table 1).

6. Conclusion

Nutritional supplements are extremely popular, and the industry continues to grow despite the downturn in the economy. Although almost one-half of all horse owners purchase and administer nutritional supplements such as OJHSs to their horses, only 11% of all supplements are purchased from veterinarians. The American Association of Equine
References and Footnotes

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References and Footnotes


Table 1. Seven-Step ACCLAIM System for Identifying and Recommending a Quality OJHS

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<th>Variable</th>
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<tr>
<td>A</td>
<td>Is the product in question manufactured by a company you recognize? Products manufactured by established companies that provide educational materials for veterinarians and consumers are preferable to OJHSs manufactured by newly formed companies.</td>
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<td>C</td>
<td>Clinical experience</td>
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Celestone, Schering Corporation, Kenilworth, NJ 07033.

Vetalog, Fort Dodge Animal Health, Fort Dodge, OH 45177.

Adequan, Luitpold Pharmaceuticals, Inc., Shirley, NY 11967.