

# MINNESOTA UROLITH CENTER \* University of Minnesota

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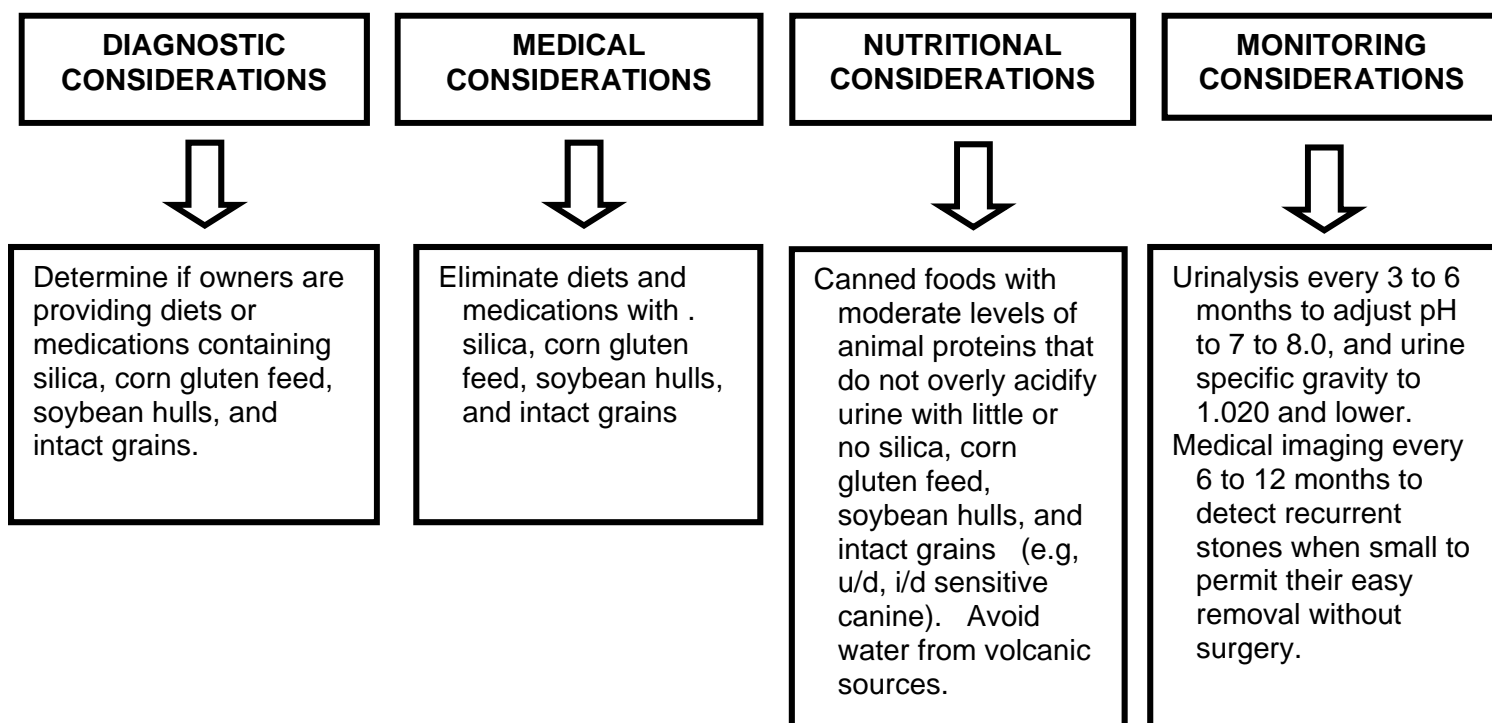
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## CANINE SILICA

Available clinical data provides a strong link between canine silica uroliths and consumption of specific dietary ingredients. Diets that contain substantial quantities of corn gluten feed or grain hulls are especially suspect. Water in volcanic areas has also been implicated in the formation of silica uroliths. The inert ingredient in some tablet medications and antacids is silica.

### PREVENTION



\*\* Review manufacturer's therapeutic food literature to determine indications/contraindications. For pets with multiple health concerns, consult a veterinary nutritionist to select an optimal food.

**In depth recommendations and references are available on our website: [urolithcenter.org](http://urolithcenter.org) under the resources tab.**

## Minnesota Urolith Center

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### CANINE SILICA UROLITHS

Available clinical data provides a strong link between canine silica uroliths and dietary ingredients. Diets that contain substantial quantities of corn gluten feed or grain hulls are especially suspect. Various urolith laboratories report the incidence of silica uroliths in dogs to be from 0.3<sup>1</sup> to 14.0%.<sup>2</sup> The incidence of silica stones is significantly higher in male dogs than in females.<sup>3,4</sup>

Effective medical protocols to induce dissolution of canine silica uroliths have not yet been developed. To minimize recurrence, select diets, dietary supplements, and medications without sources of silica. Water in volcanic areas has also been implicated in the formation of silica uroliths.<sup>5</sup>

#### Minimizing Silica Urolith Recurrence

##### Medical:

- Investigate if active or inactive ingredients of medications and vitamin or mineral supplements contain silica. If detected, select alternatives without silica.
- In humans, silica uroliths have been associated with the use of antacids (magnesium trisilicate)<sup>6</sup>, milk thickeners for infants<sup>7</sup>, and various homeopathic remedies touted for relief of a variety of illnesses.<sup>8</sup>

##### Nutritional:

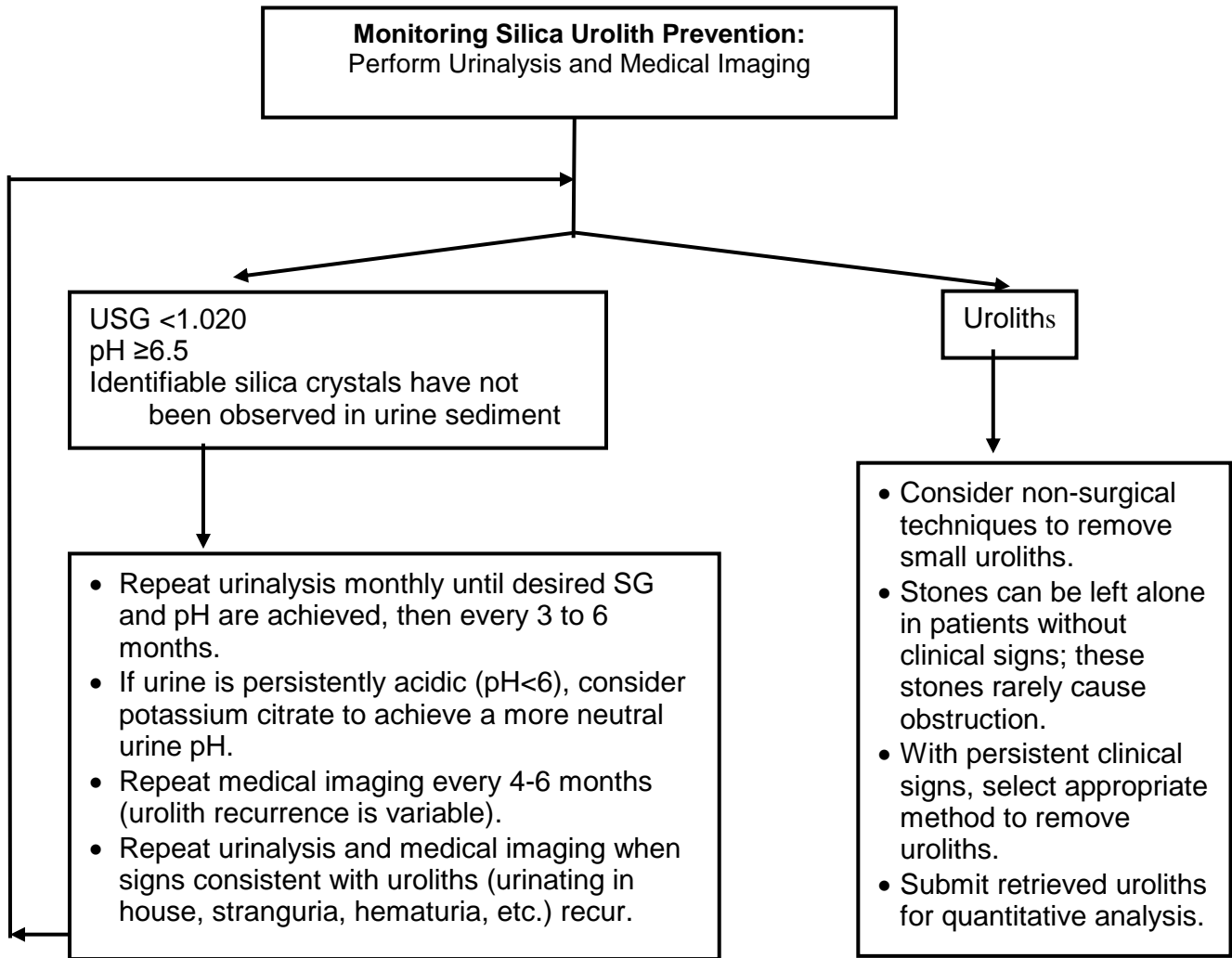
- Eliminate foods containing whole grains (e.g. certain natural diets, diets containing substantial corn gluten feed (not corn gluten meal), or intact grains (with hulls).
- Investigate and eliminate pica of grasses, woody plants, and dirt. Silica uroliths are common in range cattle and sheep that consume forage grasses with a high concentration of silica.<sup>9</sup>
- High moisture foods (i.e. canned formulations) are more effective because increased water consumption is associated with decreased urine concentrations of calculogenic minerals.
- We do not recommend sodium-induced diuresis in dogs with silica urolithiasis. Sodium promotes calcium excretion, and calcium oxalate is sometimes detected with silica in canine uroliths.
- Because of the observed association with calcium oxalate, avoid attempts to acidify urine (as acidification promotes calcium excretion).
- Provide high quality foods containing moderate quantities of animal protein and lower quantities of vegetable food stuffs. In general, cereals, grains, and their products contain high levels of absorbed silica. In humans, the amount of silica absorbed from different foods was not necessarily proportional to the level of silica in the food.<sup>10</sup>

##### Pharmacological

- Avoid the use of magnesium trisilicate containing antacids.
- Consider with caution the use of dietary supplements, homeopathic remedies, and medicines containing silica.

#### Consider These Facts:

- ✓ Prescription Diet® u/d® and Prescription Diet® i/d® Sensitive canine contain polished rice with hulls removed<sup>11</sup> and therefore are appropriate diet choices to consider for prevention.
- ✓ Silicon is the second most abundant element in soils (oxygen is the most abundant), and is the 12 mineral substrate for most of the world's plant life.
- ✓ Controlled studies evaluating silica urolithiasis have not been performed. Empirically, elimination of causative agents (silica-containing diet, dietary supplements, etc) should minimize recurrence.



**\*\* Review manufacturer's therapeutic food literature to determine indications/contraindications. For pets with multiple health concerns, consult a veterinary nutritionist to select an optimal food.**

Further references:

- <sup>1</sup>Osborne CA: Analysis of 451,891 Canine uroliths, feline uroliths, and feline urethral plugs from 1981-2007: Perspectives from the Minnesota Urolith Center: VCNA 2008; 391:83.
- <sup>2</sup>Del Angel-Caraza J: Composition of lower urinary tract stones in canines in Mexico City. Urol Res. 2010 online.
- <sup>3</sup>Osborne CA: Etiopathogenesis, clinical manifestations, and management of canine silica urolithiasis. VCNA 1986;16,1:185.
- <sup>4</sup>Low WW: Evaluation of trends in urolith composition and characteristics of dogs with urolithiasis: 25,499 cases (1985-2006). JAVMA 2010;236, 2:193.
- <sup>5</sup>Tasaki,Yumi; Ito, Genta; Momoi,Yasuyuki: Silica Urolithiasis in Dogs. Kagoshima University Repository, 2013-14 [http://ir.kagoshima-u.ac.jp/bitstream/10232/16977/2/Momoi\\_Silica+urolithiasis+in+dogs\\_2013.pdf](http://ir.kagoshima-u.ac.jp/bitstream/10232/16977/2/Momoi_Silica+urolithiasis+in+dogs_2013.pdf)
- <sup>6</sup>Page RC: Urinary excretion of silica in humans following oral administration of magnesium trisilicate. Am J Dig Dis. 1941;8:13: 13.
- <sup>7</sup>Nishizono T: Renal silica calculi in an infant. Int J. Urol. 2004;11: 119.
- <sup>8</sup>Flythe, JE: Silicate nephrolithiasis after ingestion of supplements containing silica dioxide. AJKD 2009; 54:1: 127.
- <sup>9</sup>Emerick RJ: Effect of sodium silicate on the development of urinary calculi and the excretion of various urinary constituents in sheep. J. An.Sci. 18:1959. 1025.
- <sup>10</sup>Sripanyakorn S: The comparative absorption of silicon from different foods and food supplements. BrJ Nut; 2009;102:825.
- <sup>11</sup>[www.hillsvet.com](http://www.hillsvet.com)
- <sup>12</sup>Epstein E. The anomaly of silicon in plant biology. Proc Natl Acad Sci U S A. 1994; 91:1: 11.