

Kyphosis in a Musk Turtle (*Sternotherus odoratus*) from Ontario, Canada

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Kyphosis has been recorded in many turtle species and families (Lynn, 1937; Ernst, 1976; Plymale et al., 1978; Harding and Bloomer, 1979; Wilhoft, 1980; Rhodin et al., 1984; Stuart, 1996). The deformity has most often been reported for the genera *Apalone* and *Chrysemys* (Stuart, 1996). Nixon and Smith (1949) noted that kyphosis had been observed by Hartweg in the common musk turtle, *Sternotherus odoratus*, but no details were provided. Herein, I report an additional instance of kyphosis in *S. odoratus*.

A kyphotic adult male musk turtle (Fig. 1) was captured on 25 July 1984 at Big Clear Lake, Arden, Kennebec Township, Frontenac County, Ontario, Canada (44°44'28"N, 76°54'15"W). The specimen had the following maximum dimensions: carapace length = 114.5 mm, carapace width = 75.6 mm, plastral length = 87.3 mm, and the kyphotic shell

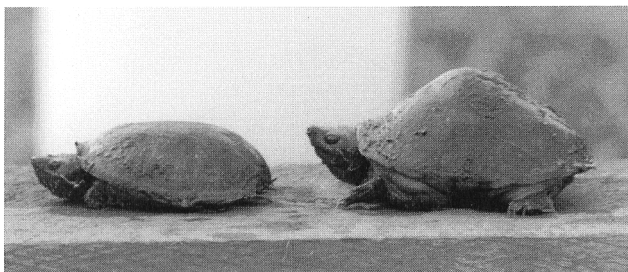


Figure 1. Normal (left) and kyphotic (right) *Sternotherus odoratus*.

height was 63.6 mm. Of 39 musk turtles (26 males, 13 females) captured at this site, only this specimen had kyphosis.

Definitions and theories for the cause of kyphosis in turtles have been reviewed by Wilhoft (1980), Rhodin et al. (1984), and Stuart (1996). Kyphosis ("hump-back") is thought to be the result of a premature fusion of the vertebral elements of the vertebral column causing unequal growth rates of the various carapacial components. Such fusion may be brought about by environmental conditions to which eggs, embryos, and hatchlings are exposed. The opposite spinal deformity of lordosis ("sway-back") can be caused by a premature fusion of the dorsal elements of the vertebral column, while allowing continual growth of the ventral vertebral centra, as recorded in cases of infection causing neural synostosis and lordosis in sea turtles (Kochinsky et al., 1995). Neither kyphosis nor lordosis is common, with the overall incidence of spinal deformities calculated at about 0.1% in a sample of over 11,000 sea turtles (Rhodin et al., 1984).

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LITERATURE CITED

- ERNST, C.H. 1976. Ecology of the spotted turtle, *Clemmys guttata* (Reptilia, Testudines, Testudinidae), in southeastern Pennsylvania. *J. Herpetol.* 10:25-33.
- HARDING, J.H. AND BLOOMER, T.J. 1979. The wood turtle, *Clemmys insculpta*...a natural history. *Herp - Bull. N.Y. Herp. Soc.* 15:9-26.
- KOCHINSKY, L.J., WONDOLOWSKI, C., AND RHODIN, A.G.J. 1995. Neural bone synarthrodial joint infection causing inter-neural synostosis and lordotic spinal deformities in captive-raised sea turtles (Cheloniidae). *Herpetopathologia* 2:105-120.
- LYNN, W.G. 1937. Variation in scutes and plates in the box turtle, *Terrapene carolina*. *Amer. Nat.* 71:421-426.
- NIXON, C.W. AND SMITH, H.M. 1949. The occurrence of kyphosis in turtles. *Turtlox News* 27:28-29.
- PLYMALE, H.H., JACKSON, C.G., JR., AND COLLIER, G. 1978. Kyphosis in *Chrysemys picta yakuia* (Testudines: Emydidae) and other turtles. *Southwestern Nat.* 23:457-462.
- RHODIN, A.G.J., PRITCHARD, P.C.H., AND MITTERMEIER, R.A. 1984. The incidence of spinal deformities in marine turtles, with notes on the prevalence of kyphosis in Indonesian *Chelonia mydas*. *Brit. J. Herpetol.* 6:369-373.
- STUART, J.N. 1996. Additional records of kyphosis in freshwater turtles. *Bull. Chi. Herp. Soc.* 31:60-61.
- WILHOFT, D.C. 1980. Kyphosis in the snapping turtle *Chelydra serpentina*. *Herp - Bull. N.Y. Herp. Soc.* 15:15-26.

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