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On the chord property for the pair of convex bodies

Let K be a convex body in \mathbb{R}^d , $d \geq 3$, and let K_δ be its floating body for some fixed $\delta \in \left(0, \frac{\text{vol}_d(K)}{2}\right)$. Assume that for all sections $K \cap H$ that are tangent to K_δ , the length of all the chords $g \subset K \cap H$ passing through the centers of mass of all $K \cap H$ is the same. Does it follow that K and K_δ are concentric Euclidean balls? We show that the answer is affirmative for bodies of revolution.