A.D. Alexandrov's conjecture and hyperbolic virtual polytopes

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We give a 3D illustrated introduction to the theory of hyperbolic (=saddle) virtual polytopes. They appeared as an auxiliary tool for constructing counterexamples to the following conjecture of A.D. Alexandrov:

Given a smooth compact convex body K in R3, if a constant C separates (non-strictly) its principal curvatures at every point of its boundary, then K is a ball.

Hyperbolic polytopes link this conjecture with the theory of pointed tilings.

The talk is based on the papers by M. Knyazeva, Y. Martinez-Maure, and the speaker.

Some of the pictures are available at

http://club.pdmi.ras.ru/∼panina/hyperbolicpolytopes.html