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**Title:** Group theoretic Dehn surgery.

**Abstract:** Thurston's Dehn surgery theorem states that all but finitely many Dehn fillings of a hyperbolic knot complement are hyperbolic. Historically this theorem was the first nontrivial evidence towards the famous Geometrization Conjecture. Another theorem, commonly attributed to Gromov, states that the quotient of a non-elementary hyperbolic group by a high power of an infinite order element is again non-elementary hyperbolic. Iteration of this result yields an easy solution to one of the oldest and most influential questions in group theory, the general Burnside problem. In my talk, I will explain that these results are special instances of a more general theory having many other interesting applications. I will begin with an elementary introduction to Dehn surgery in 3-manifolds, hyperbolic spaces and groups, etc., so no previous familiarity with these notions is required.