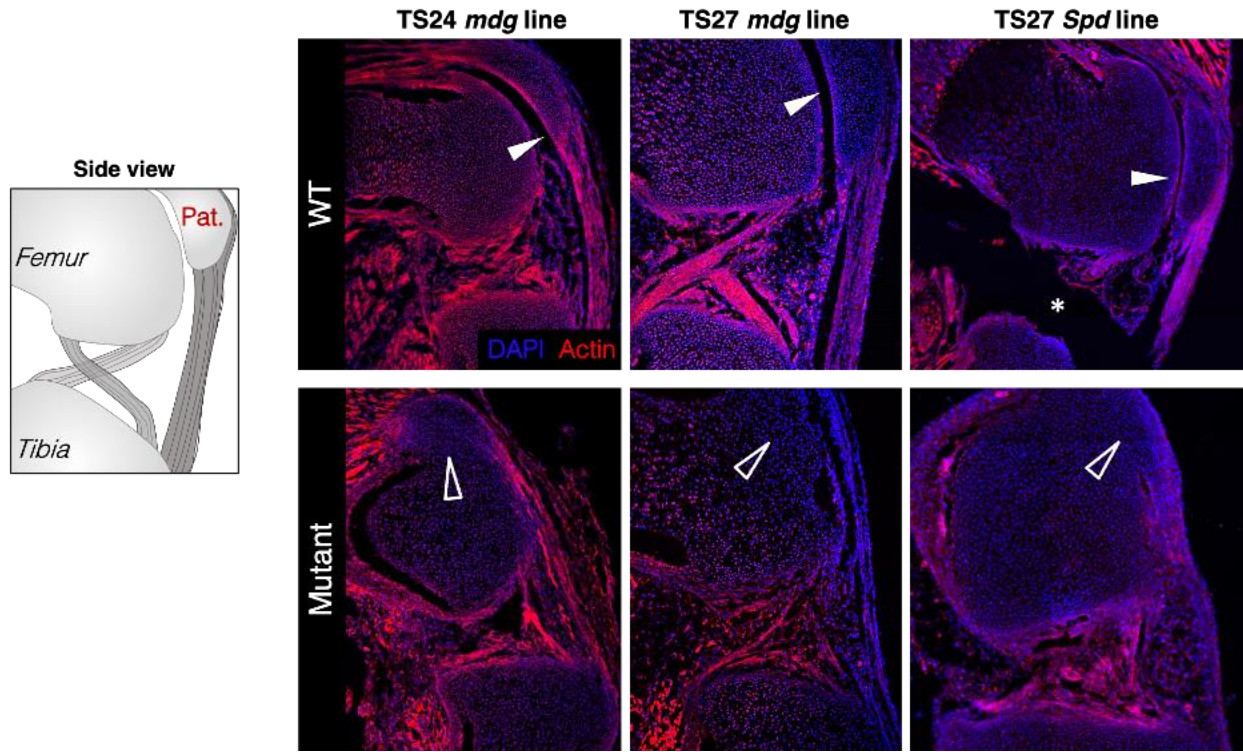
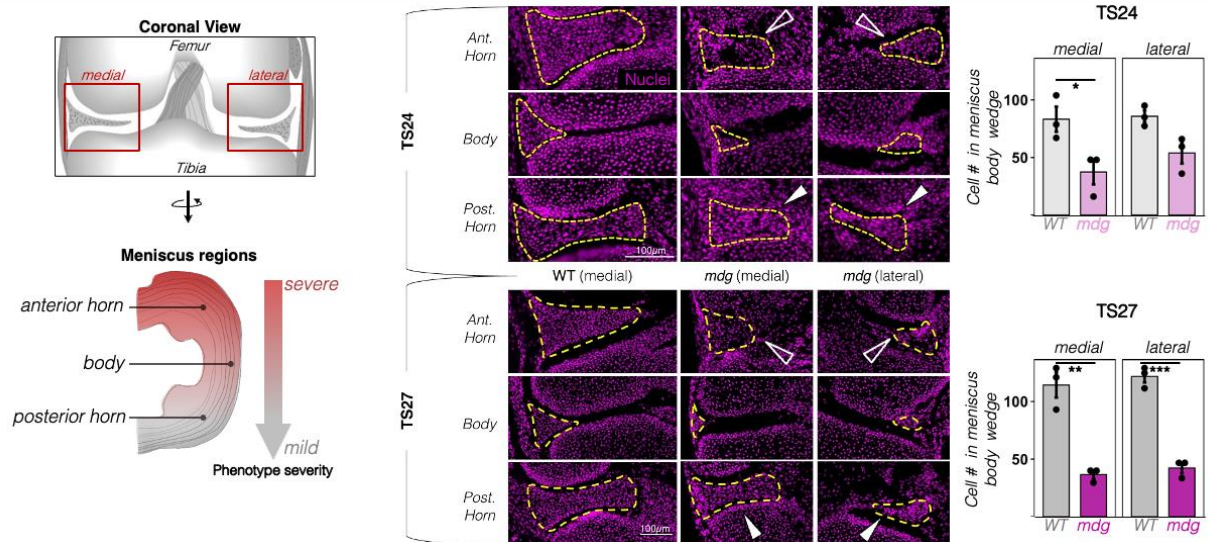


SUPPLEMENTAL MATERIAL

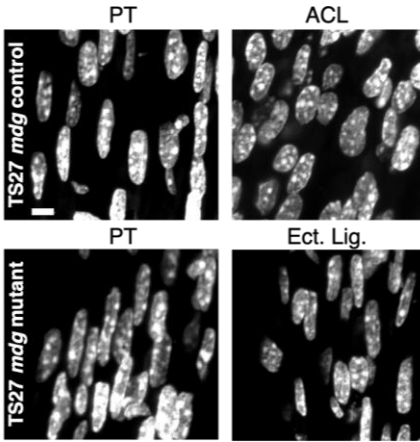


**Figure S1:** Sagittal sections of WT and mutant littermates for the *mdg* line at TS24 and TS27 and the *Spd* line at TS27. Full white arrowheads in WT images point to the patella, fully detached from the femoral head. Empty white arrowheads in mutant images show a condensed patella that remains fully fused to the femoral head, indicating a lack of cavitation. White asterisk denotes a sectioning artifact.

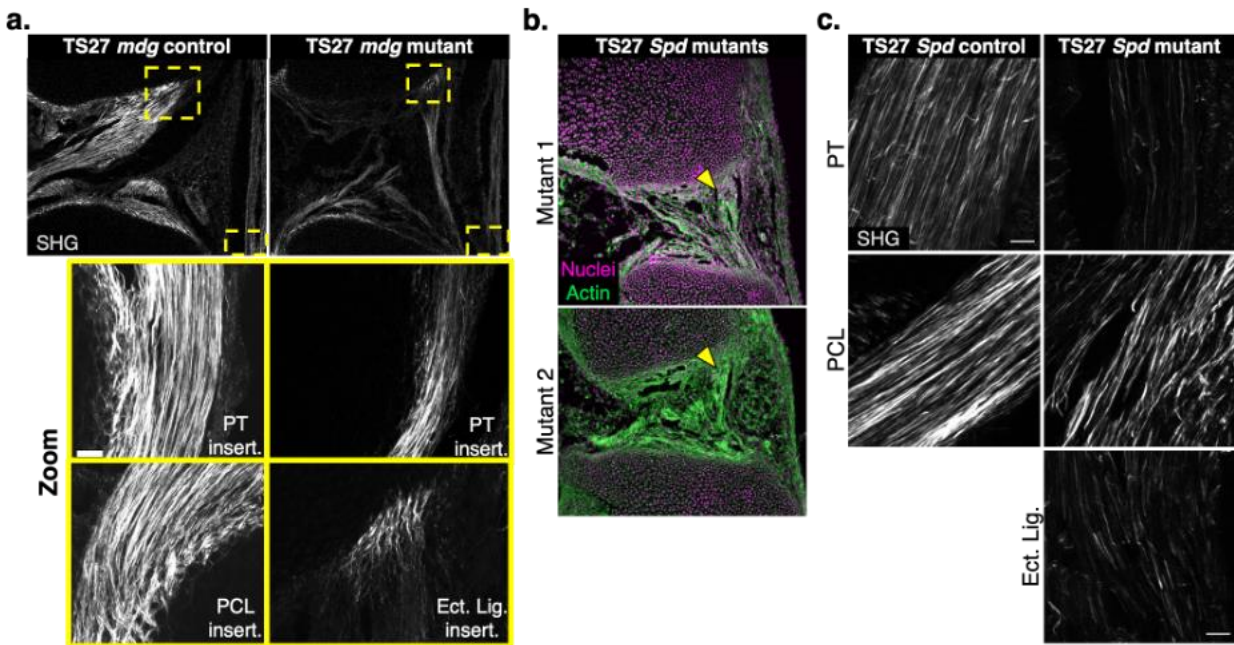


**Figure S2:** Coronal nuclear stained sections from the anterior horn, body, and posterior horn of medial and lateral nascent menisci (yellow outlines) at TS24 and TS27, and quantification of cell number in the body region of the meniscus wedge of medial and lateral menisci at the two timepoints. Empty white arrowheads show reduced (TS24) and absent (TS27) cell condensation in the anterior horn regions of medial and lateral

*mdg* menisci. Full white arrowheads denote preservation of the posterior horn condensation in the *mdg* mutants. Together, this points to a gradient of phenotype severity in *mdg* menisci (schematic). Note that quantification for the cell number in the medial meniscus body is the same as presented in Fig. 2b.



**Figure S3:** Representative images of cell nuclei of TS27 control and *mdg* mutant tissues (scale bar: 5 $\mu$ m).



**Figure S4:** a) Representative maximum projection SHG images of TS27 *mdg* control and mutant joints imaged in the sagittal plane within the region of the PCL and patellar tendon. Lower panels show higher magnification of regions outlined in yellow boxes (scale bar: 20 $\mu$ m). b) Representative sagittal sections of two TS27 *Spd* mutant littermates within similar regions of the knee joint space. Yellow arrowhead demarcates presence of ectopic ligament, similar to what is shown for *mdg* mutants in Figs. 3-4. c) Maximum projection SHG images of TS27 control and *Spd* tissues (scale bar: 10 $\mu$ m).