456 Figure 3 Real-time PCR of cartilage expressed genes in WT and $Bgn^{-/-}Fmod^{-/-}$

457 treated without or with BMP-2. A) Type II collagen ($Col2$), B) Type X collagen

458 ($Col10$) C) $Sox9$, D) ihh. #p<0.01.

459

460 Figure 4. Immunohistochemistry (IHC) and real-time PCR of genes expressed in

461 fibrocartilage and bone. A) IHC of type I collagen in WT (left panels) and $bgn^{-/-}$,

462 $fmod^{-/-}$ deficient condyles (right panels) treated without (top panel) or with (bottom

463 panels) BMP-2.   B) Real-time PCR of type I collagen ($Col1$), C) $Runx2$ D) osterix

464 (Osx) and E) $Wisp1$ mRNA in WT and $Bgn^{-/-}Fmod^{-/-}$ condyles treated with or

465 without BMP-2. *p<0.05, #p<0.01

466

467 Figure 5. Assessment of bone resorption A) Tartrate Resistant Acid Phosphatase

468 (TRAP) staining of osteoclasts in WT (left panels) and $Bgn^{-/-}Fmod^{-/-}$ deficient

469 condyles (right panels) treated without (top panel) or with (bottom panels) BMP-2.

470 Real-time PCR to measure levels of B) TRAP ($Acp5$) C) $Rankl$ D) and AdamTS4

471 mRNA.

472

473 Supplementary:

474

475 Table S1. Primer sequences used for Real-Time PCR

476

477 S1. Diagram showing an outline of experimental approach used to treat and

478 analyze the TMJ from WT $Bgn^{-/-}Fmod^{-/-}$ mice.

479

480   S2. Low power view of condyle showing fibrocartilage, cartilage and subchondral

481   bone layers. The Safranin O red stained area was used to quantify the relative

482   area of cartilage present in treated and untreated WT and $Bgn^{-/-}Fmod^{-/-}$ condyles.

483
484

Table 1 Primer sequences used for real-time PCR

Acan　　　　forward 5' CCCGGTACCCTACAGAGACA3',
　　　　　　　reverse 5' ACAGTGACCCTGGAACTTGG3',

Col2A1　　　forward 5' CGAGGGCAACAGCAGGTTCACATAC3'
　　　　　　　reverse 5' GTCAATAATGGGAAGGCGGGAGGTC3'

Col10A1　　forward 5' GGGATGCCGCTTGTCAGTGCTAAC3'
　　　　　　　reverse 5' TGGGTCGTAATGCTGCTGCCTATTG3'

Sox9　　　　forward 5' TCAGATGCAGTGAGGAGCAC3'
　　　　　　　reverse 5' CCAGCCACAGCAGTGAGTAA3'

IHH　　　　　forward 5' ACGTGCATTGCTCTGTCAAG3'
　　　　　　　reverse 3' CTCGATGACCTGGAAAGCTC3'

Col1A1　　　forward 5' CACCCTCAAGAGCCTGAGTC3'
　　　　　　　reverse 5' GCTTCTTTTCCTTGGGGTTC3'

Runx2　　　forward 5' GCAGTTCCCAAGCATTTCAT3'
　　　　　　　reverse 5' CACTCTGGCTTTGGGAAGAG3'

osx (SP7)　forward 5' AAGTGTGTGTGCCGTGGATA3'
　　　　　　　reverse 5' GTCGAGAGGACTGGGGTACA3'

Wisp1　　　forward 5' ATCGCCCGAGGTACGCAATAGG3'
　　　　　　　revserse 5'CAGCCCACCGTGCCATCAATG3'

Acp5 (Trap)　forward 5' CAGCAGCCAAGGAGGACTAC3'
　　　　　　　revserse 5'ACATAGCCCACACCGTTCTC3'

Rankl　　　forward 5'ATCGTGGTGTATGTCAGCCA3'
　　　　　　　revserse 5'GTCATTCTGCACATTGTCCG3'

Adamts4　　forward 5'CGCTGACCGCCAATGCCAACTG3'
　　　　　　　revserse 5'CGCTGACCGCCAATGCCAACTG3'

S29　　　　forward 5'GGAGTCACCCACGGAAGTTCGG3'
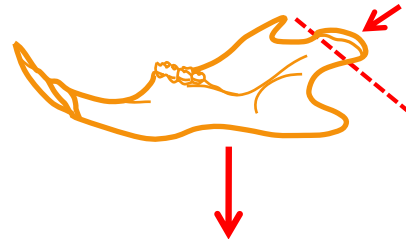　　　　　　　reverse 5'GGAAGCACTGGCGGCACATG3'
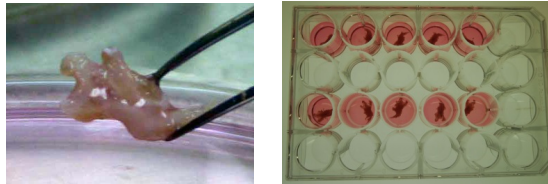
isolate whole mandible condyles from WT or *Bgn$^{-/-}$Fmod$^{-/-}$* mice

3 (histology) or 5 weeks (mRNA)
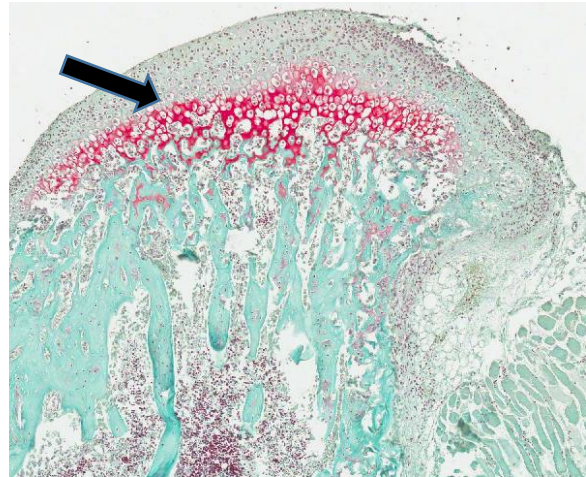
culture explants 24 -well plate for 24h

+/- BMP-2 48 hours

collect explants
microCT, histology and mRNA analysis

S1 Experimental Design

Fibrocartilage

Cartilage

Subchondral Bone

**S2. Safranin-O positive region (red stain) of the condyle under low power
Showed the region of the condyle that was measured (arrow).**