

# A Case Study of a French Bulldog Mix Puppy Presenting With Osteogenesis Imperfecta

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## Case Presentation



Figure 1-Leah 1/20/23

Leah is a sixteen-week French Bulldog mix who presented to Suncook River Veterinary Clinic (SRVC) in January 2023 with a history of immobility and multiple fractures in the pelvis, tibia, and rib. The patient visited an emergency clinic prior to SRVC. During handling at the clinic, she sustained the fracture to her rib. Dr. Fiona Reeve led the team in the patient's evaluation, diagnosis, and treatment.

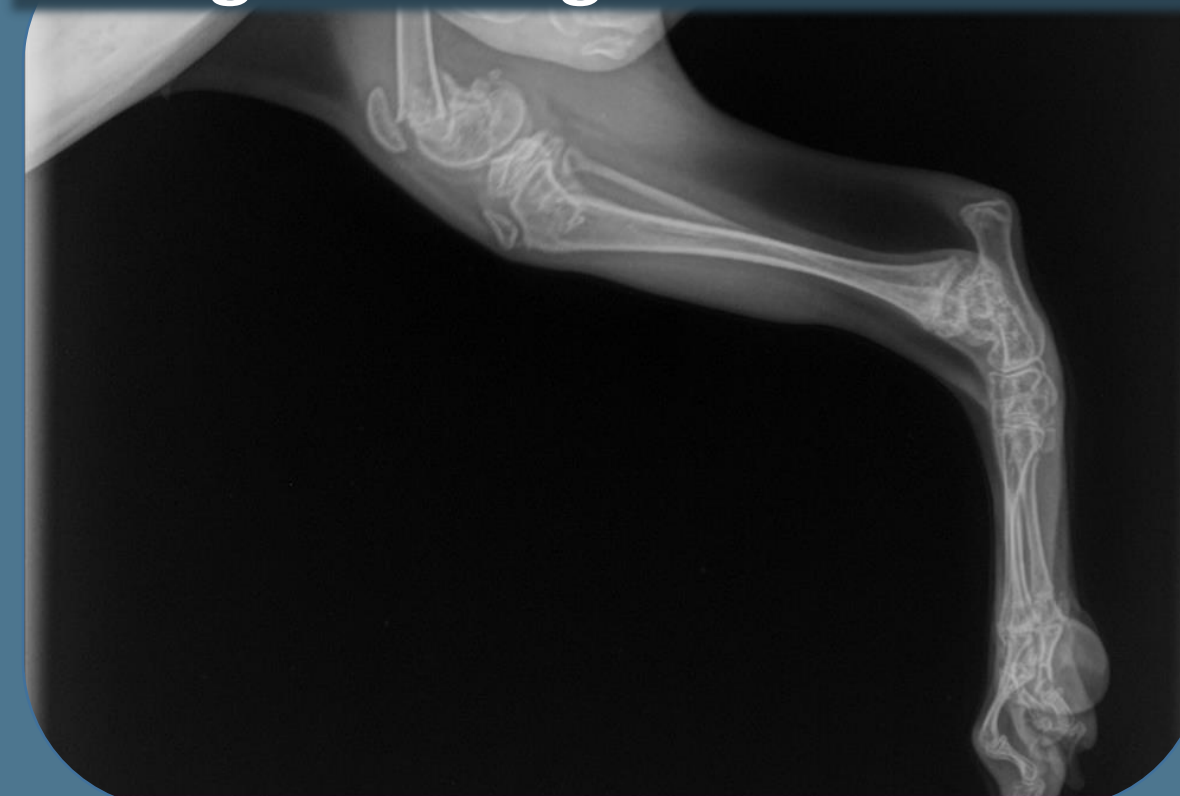
## Evaluation

Records received from the previous clinic showed prior fractures in the final stages of healing (figures 2 and 3). An evaluation of these fractures and a physical exam were performed.

Figure 2-Right front elbow



Figure 3-Right hind knee



After assessing her quality of life, the patient's treatment plan was developed. Goals of treatment included improving Leah's comfort and confidence, generating muscle and bone mass, and increasing mobility. Diagnostic measures typically include radiographic images, bloodwork panels to test for genetic alterations, and manipulation of the bones and joints. These diagnostics were considered unnecessary to providing treatment and the resources for testing were allocated towards the patient's stay rather than lab work. Regardless of the underlying conditions, the fractures are treated the same.

## Diagnosis: Osteogenesis Imperfecta

The patient's history and radiographs were sufficient to diagnose the patient with Osteogenesis Imperfecta (OI). OI, commonly called "Brittle Bone Disease", is a common genetic connective tissue disease altering type 1 collagen production. A nonsense or frameshift mutation in the COL1A1 or COL1A2 gene results in the dominant form of OI, while the recessive form is caused by mutations in one of six genes that control the chaperone proteins of collagen production. All of these mutations alter the amount and/or quality of collagen, resulting in brittle bones. The overall frequency of recessive OI ("Dachshund type") in Dachshunds is estimated to be 12.9%. The dominant OI ("Golden Retriever type") is very uncommon because dogs that suffer from OI will rarely reproduce. It is not known with which form Leah was born.

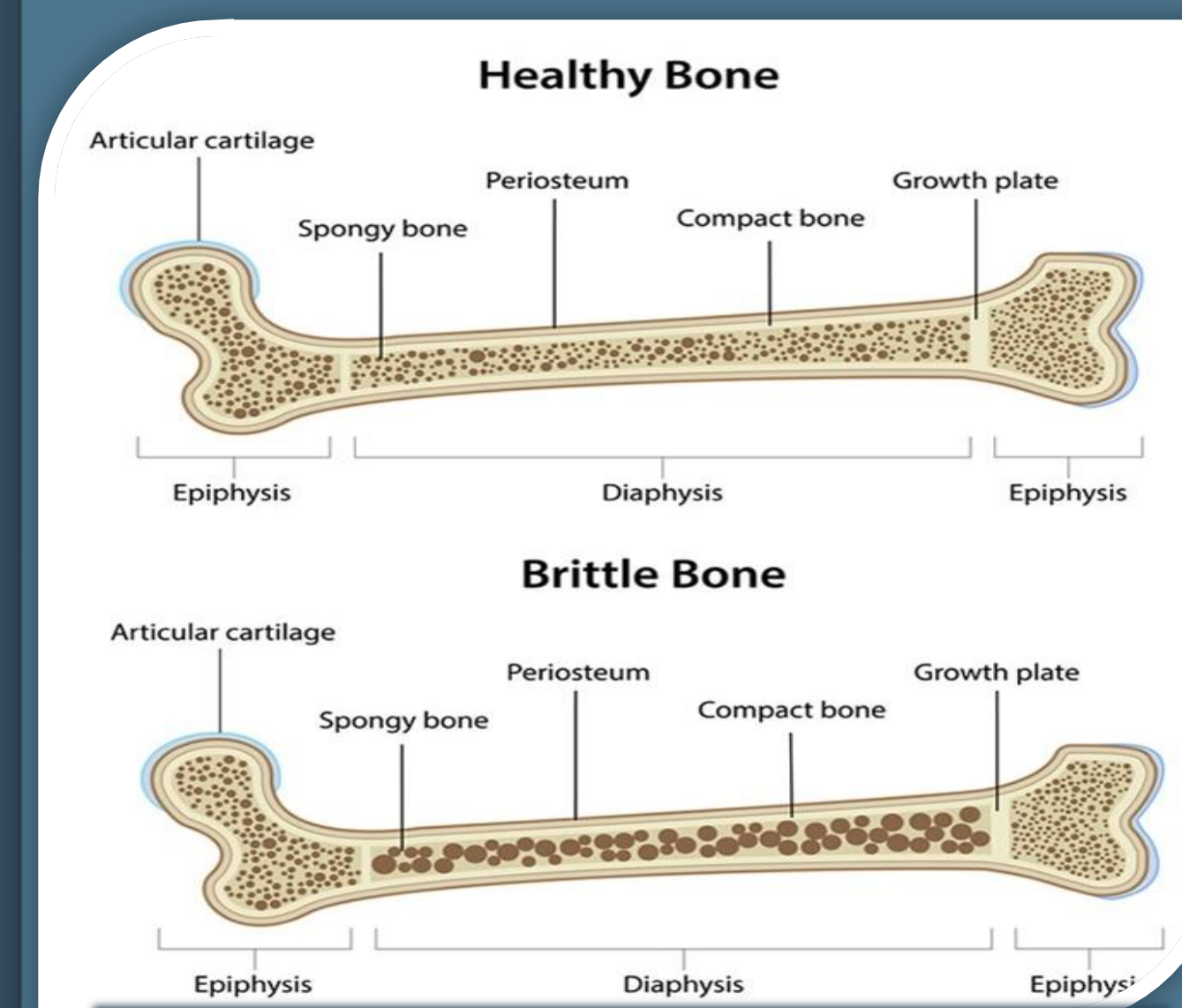


Figure 4-Healthy Bone vs. OI

## Treatments

The patient's treatments consisted of pain management, physical therapy, and laser therapy. Gabapentin, often used in long-term treatment of pain, was given to Leah twice per day. Physical therapy worked the atrophied muscles needed to walk and balance. Laser improved healing by influencing the release of growth factors and minimizing inflammation and pain, all of which increased her range-of-motion without negative side effects (Figure 5). The patient responded very well and began standing for several minutes. In the following weeks, she took unassisted and confident steps (figure 6).

Figure 5-Laser Therapy

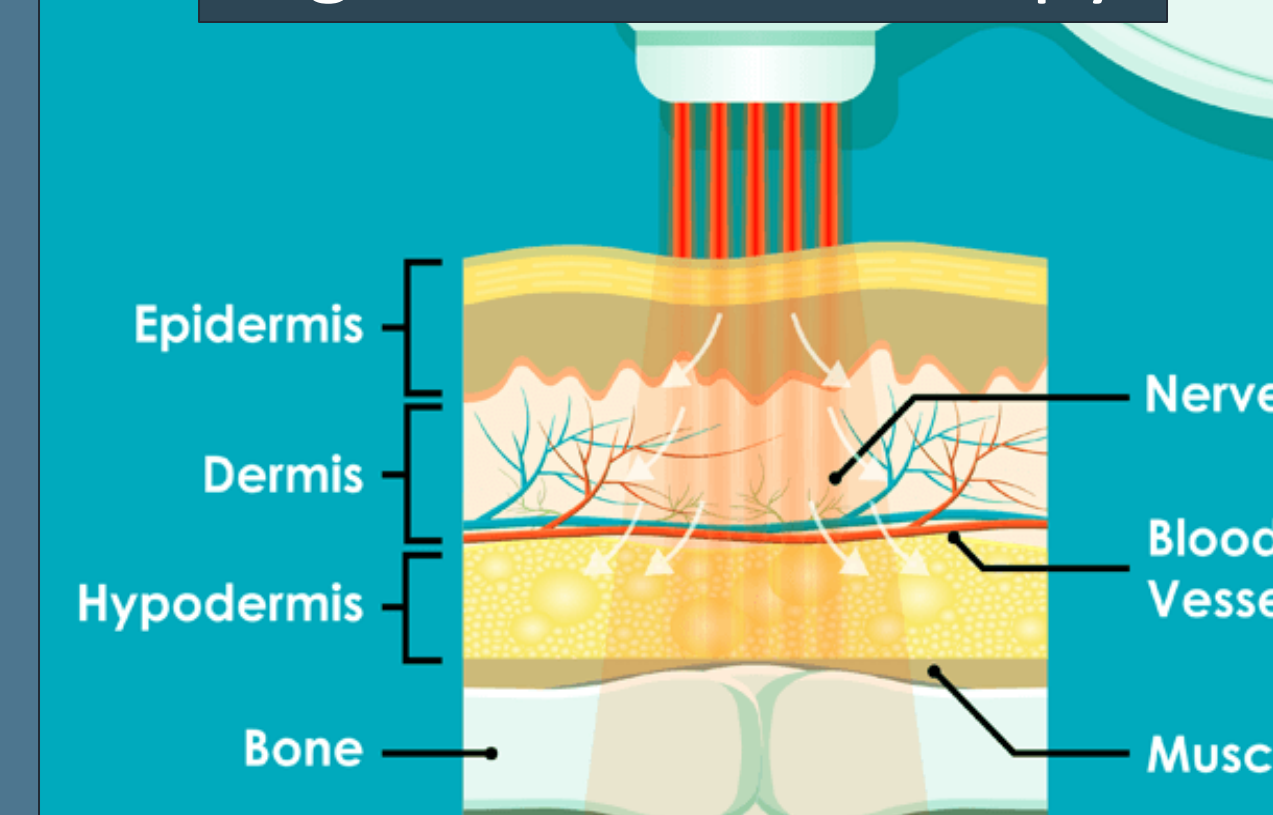


Figure 6-Leah standing

## Outcome

The patient sustained a fracture in her tibia and fibula as a result of playing (figure 7). A brace was unable to be placed to realign the bones, and surgical intervention was ruled out due to two previous failed attempts on the elbow.



Figure 7-Left hind leg

After assessing all options, it was decided not to prolong the patient's pain and euthanasia was elected the same day: February 28, 2023 (figure 8).

## Discussion

This patient's case was especially interesting because typically dogs born with OI are euthanized in the first weeks of life. The treatments administered provided the patient with the opportunity to learn how to stand and walk. Leah lived a longer and healthier life than most dogs with OI due to the attention and support she received. Working with Leah also highlighted the potential challenges that come with caring for a dog with OI.

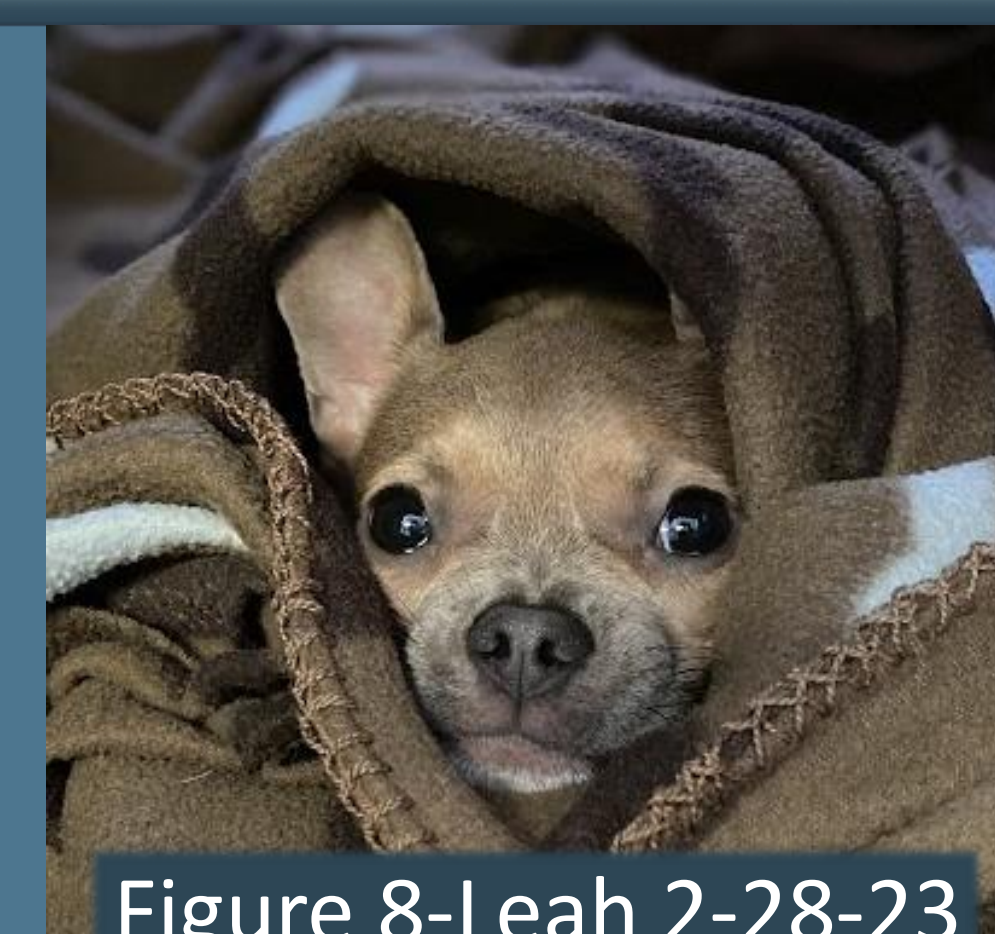


Figure 8-Leah 2-28-23

## References

- Gold, Randi, et al. "Osteogenesis and Dentinogenesis Imperfecta in a ... - Wiley Online Library." *British Veterinary Association*, DOI, 5 July 2019, <https://bvajournals.onlinelibrary.wiley.com/doi/10.1136/vetreccr-2019-000835>.
- "Osteogenesis Imperfecta (Dachshund Type)." *Paw Print Genetics - Osteogenesis Imperfecta (Dachshund Type) in the Dachshund*, NEOGEN, <https://www.pawprintgenetics.com/products/tests/details/85/2breed=154>.
- Phillips, Natalie. "Laser Therapy: Purpose, Procedure, and Risks." Edited by Euna Chi, *Healthline*, Healthline Media, 29 Aug. 2018, <https://www.healthline.com/health/laser-therapy>.
- Vorwallner, Justin. "The Biological Effects of Laser Therapy." *Aspen Laser*, 19 May 2022, <https://www.aspenlaser.com/the-biological-effects-of-laser-therapy/>.