



## Does the use of functional feed impact the formation of spinal deformities?

E. Hoel, M. I. Bjerkeset, K. Berge, J. Rennemo

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## Scope

Examine if the use of functional feed can lead to spinal deformities.

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## Trial A – Functional diet at sea

- Atlantic Salmon
- S0 transferred September 2016
- 3 cages recieved functional diet
- 3 control cages
- Sampling for spinal deformities during 2017:
  - Week 22
  - Week 43
  - Week 49



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## Regime of functional feed

Period	Functional feed
First 8 weeks	Spirit Supreme
November-December	Protec Gill
New year-medio May	Shield
June-October	Protec (pulse)

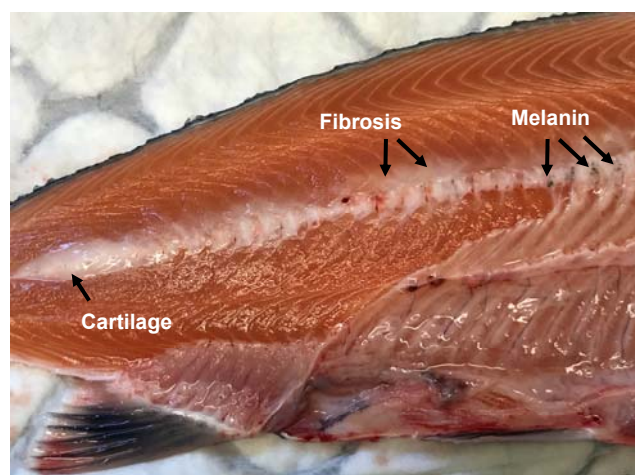
- **Approx. 40% functional feed in total**
- **Control diet: Same base formulation w/o functional ingredients.**

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## Examination of muscular fibrosis and cartilage

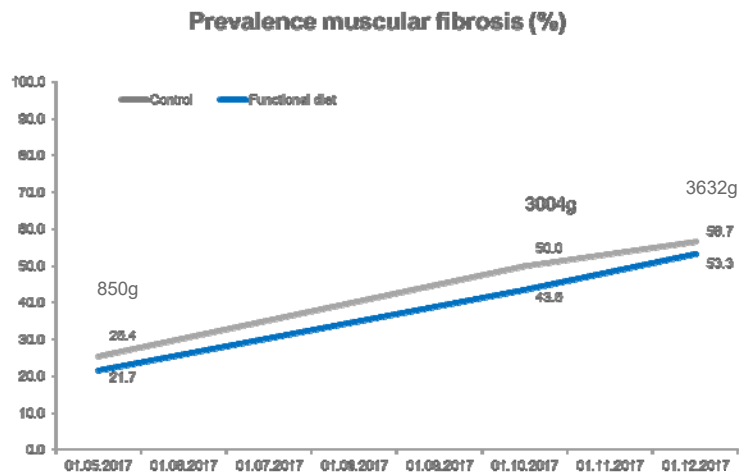
### Muscular fibrosis and cartilage in filet:

- Findings in association with the backbone
- Likely to be a reaction on the deformity
- Can lead to downgrading of the filet



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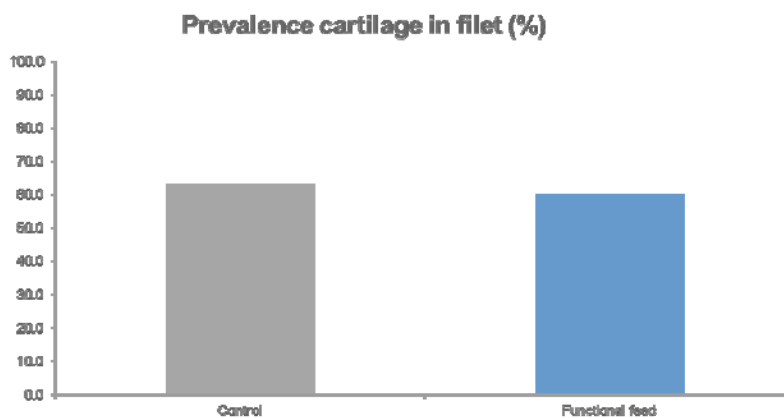
## Result muscular fibrosis



- 3 pens with a total of 120 fish for each group examined respectively for the two last samplings.
- No statistical differences between control and functional group

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## Result cartilage in filet – last sampling 3,6 kg



- 3 pens with a total of 120 fish for each group examined.
- No statistical differences between control and functional group.

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## X-ray

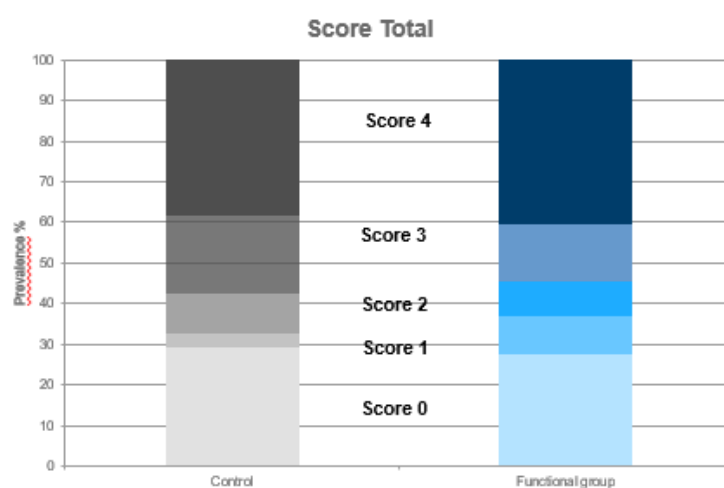
- Examiner: Grete Bæverfjord, NOFIMA
- Blinded evaluation regarding the diet.
- Data statistically evaluated after scoring system:

X-ray score	Number of affected vertebrae
0	0
1	1-5
2	6-15
3	16-25
4	>25

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## X-ray – All lesions



- 3 pens with a total of 120 fish for each group examined.
- No statistical differences between control and functional group.

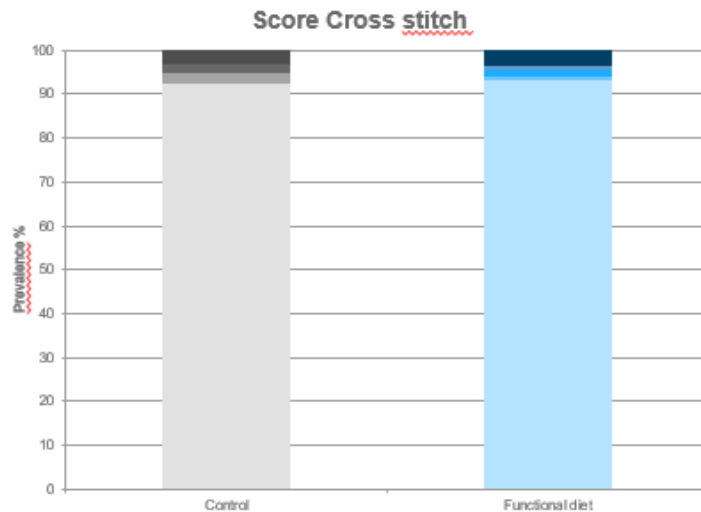
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**EH1** Eirik Hoel; 10.08.2018

## X-ray – Cross stitch lesions



- 3 pens with a total of 120 fish for each group examined.
- No statistical differences between control and functional group.
- Cross stitch prevalence approx. 7%.

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## Trial A - Summary

- No statistical difference in the prevalence of:
  - Total spinal lesions
  - Cross stitch lesions
  - Muscular fibrosis
  - Cartilage in filet



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CAC licence - 16 years of collaboration

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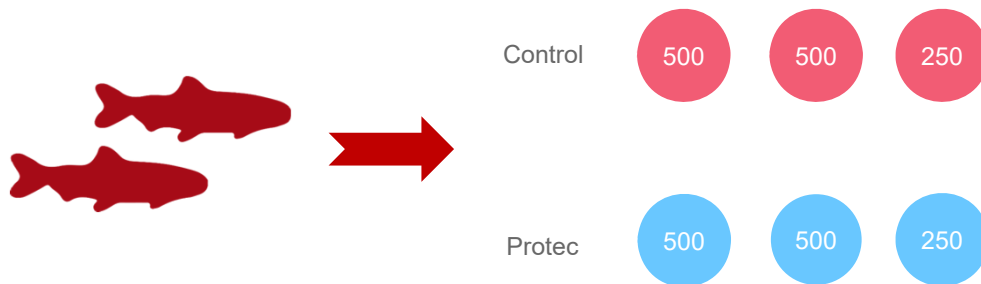
## Field trial B – Functional diet in freshwater

Cooperation between VESO, MSD og Skretting

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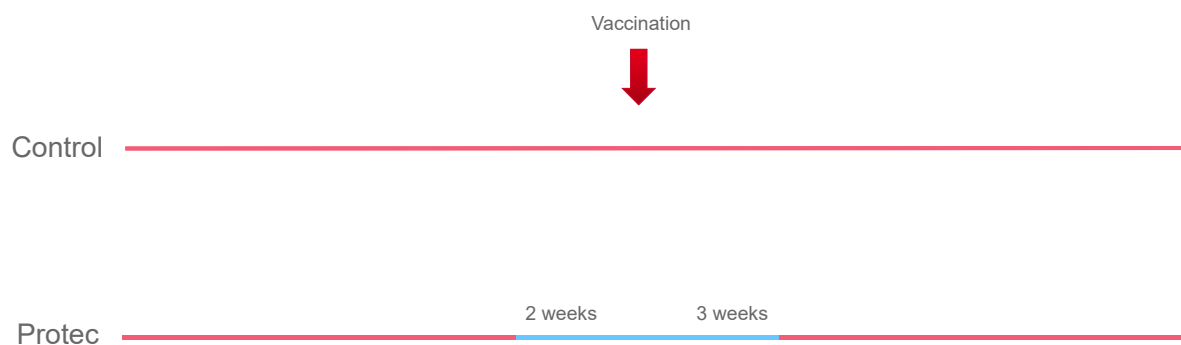


## Trial set up - VESO



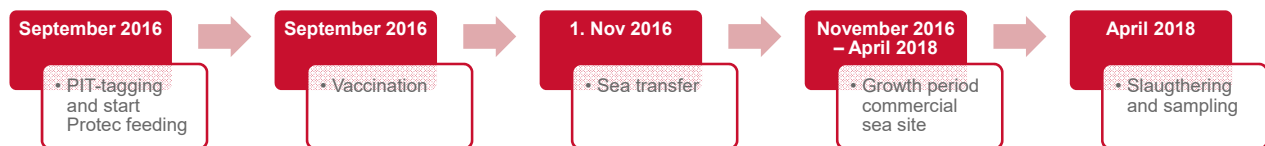
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## Feeding regime fresh water



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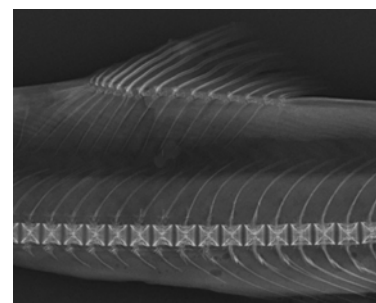
## Timeline



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## Trial set up

- The fish were examined macroscopically:
  - Fileting and examination for muscular fibrosis and cartilage
  - X-ray
    - Examiner: Grete Bæverfjord, NOFIMA
- Blinded evaluation regarding the diet.



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## Result muscular fibrosis and cartilage

	Control	Protec
Count fish examined	115	128
Count muscular fibrosis	2	2
Count cartilage in filet	0	0

- Sparse findings of fibrosis
- No findings of cartilage in filet

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## X-ray

- Examiner: Grete Bæverfjord, NOFIMA
- Blinded evaluation regarding the diet.
- Data statistically evaluated after scoring system:

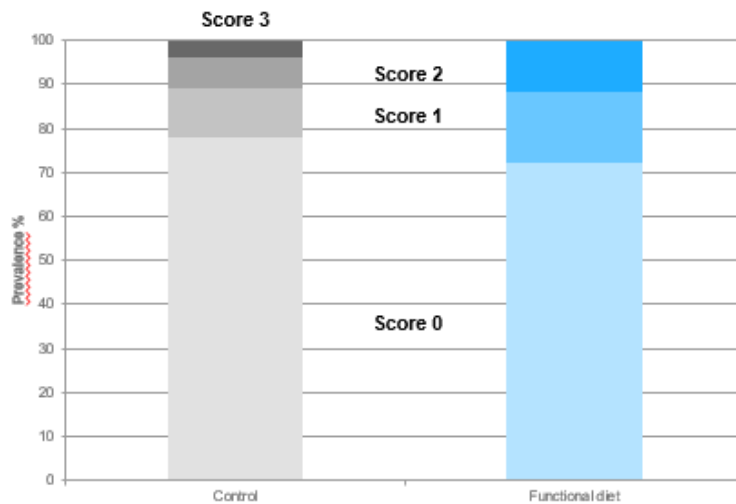
X-ray score	Number of affected vertebrae
0	0
1	1-5
2	6-15
3	16-25
4	>25

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## X-ray – All lesions

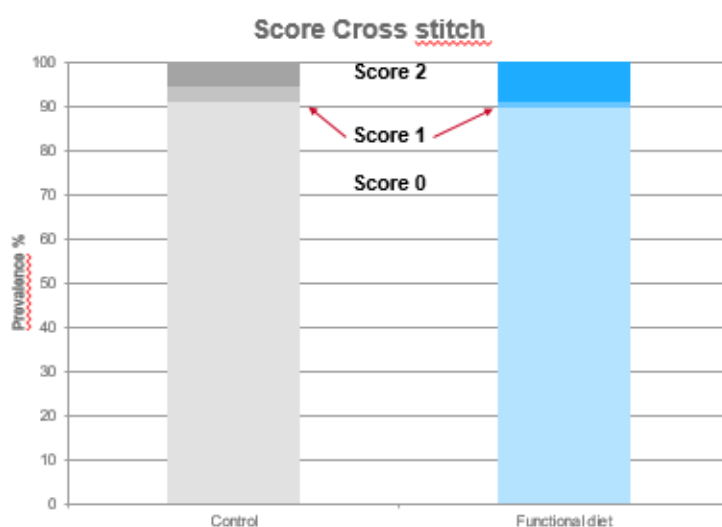


- 55 backbones in the control group and 68 backbones in the functional group examined by Grete Bæverfjord, NOFIMA.
- No statistical differences between control and functional group.

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## X-ray – Cross stitch lesions



- 55 backbones in the control group and 68 backbones in the functional group examined by Grete Bæverfjord, NOFIMA.
- No statistical differences between control and functional group.
- Prevalence of approx. 10% cross stitch lesions.

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## Trial B - Summary

- No statistical difference in the prevalence of:
  - Total spinal lesions
  - Cross stitch lesions
- Sparse findings of muscular fibrosis
- No findings of cartilage in filet



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## Conclusion

- In trial A and B the use of functional feed was not a risk factor for developing spinal deformities.



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