

Signal processing to investigate the effects of respiratory maneuvers using surface electromyogram (sEMG)

Project Summary

In this project, surface electromyogram (sEMG) data of different respiratory maneuver will be investigated. After a medical and technical literature research one task in the project is the preprocessing of the sEMG data. The main task is the analysis of the different maneuvers. The final step is the comparison with the pressure curves.

Project Type

- BA Thesis (3 months)
- MA Thesis (6 months)

Required Qualifications

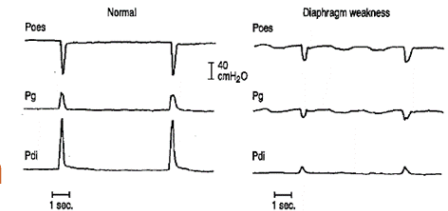
- Interest in signal processing
- Programming skills in MATLAB / Python (optional)

Contact

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Detailed Description

In clinical practice, respiratory maneuvers are used as an initial guide for measuring respiratory muscle function. If the measurements fall below maneuvers-specific thresholds, this may indicate a present respiratory muscle weakness, e.g. of the diaphragm. An example of respiratory maneuvers is the sniff maneuver, which is a sharp, short inhaling. Transdiaphragmatic pressure can be approximated by inserting balloon catheters to measure the pressure difference between esophageal (Poes) and gastric (Pg) pressures, which is invasive. Diaphragmatic weakness may be detected by evaluation of the transdiaphragmatic pressure. In this project, the effects of respiratory maneuvers within the sEMG-signal should be investigated.



References

- American Thoracic Society/European Respiratory Society. ATS/ERS Statement on respiratory muscle testing. 2002. DOI: 10.1164/rccm.166.4.518
- Kabitz et al.: Empfehlungen der Deutschen Atemwegsliga zur Messung der Atemmuskelfunktion. 2014. DOI: 10.1055/s-0034-1365283