

# Biosignal artifacts

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Signature: Carmeljcaruana (talk)



## Introduction

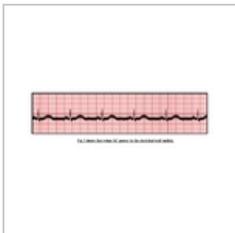
Biosignal artifacts may be defined as any unwanted interference which alters the accuracy of the reading obtained from the electrophysiological structure being studied. These may be caused by errors in the accusation of data such as patient movement , due to surrounding bioelectrical signals from other tissues or by the malfunctioning of the device that is utilised . Artifacts are found in EEGs , ECGs , These can be from both external as well as internal sources . Unfortunately a lot of these artifacts tend to have frequencies quite similar to biosignals desired to be measured and often with a greater amplitude . Below is a chart to illustrate how amplitudes and frequencies of simple everyday signals can overlap with those of the biosignals within our body to form artifacts .

Signal component	Bandwidth	Amplitude
ECG	0.05 - 100 Hz	0.5 - 5 mV
EEG	0.5 - 100 Hz	0.5 - 5 mV
EMG	10 - 1000 Hz	0.5 - 5 mV
ECG (ECG)	0.05 - 100 Hz	0.5 - 5 mV
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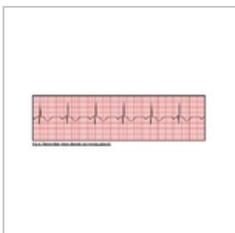
## Types of Artifacts

### External Sources:

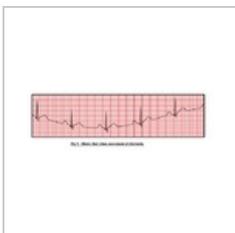
1. AC interference



2. Reversed leads

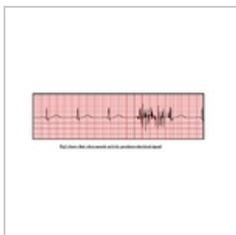


3. Poor contact causing interaction of signals between gel and other body fluids



### Internal Sources

## 1. signals produced by muscles and other organs



## 2. artifacts emanating from the surface of the epidermis



## Clinical Importance

These artifacts do not have any real significance clinically and are instead these ought to be removed . There are various methods involved in the removal of artifacts . removal of artifacts can be done by making sure the patient is relaxed and does not move or speak , utilising the filters present in the device such as muscle filters , making sure the electrodes or transducers are not gel-dry and are moist . Artifact removal is primarily used in EEGs (electroencephalograms) and ECGs (electrocardiograms) . The build up of oils and proper lubrication between the two adjoining media is also key method of removal . These biosignals after being filtered and cleared of artifacts are safe to be used to check for fluctuations in the patients physical or mental state in the field of surgery or or in the diagnosis of symptoms for a disease . They can occur during seemingly unavoidable circumstances such as the blinking of the eyes and hence it is impossible to completely prevent them . They must be prevented to the utmost level and removed later .

Artifact removal does not cause any discomfort to the patient but it is the more of a nuisance for the medical staff in charge of the patient . Though the use of modern technology has reduced its effect over the years . Recent medical advancements have shown that the biosignals corrected and removed of artifacts could later be used to recognise the various emotions of a person .

## Conclusion

Biosignal artifacts are costly , time-consuming in the field of EEGs , ECGs , MCGs etc. But have to be removed otherwise the values of the readings would become non-factual . Taking precautions is crucial , followed by a thorough understanding about the sources and prevention of their occurrence . Altogether biosignal artifacts lack any benefit and must be eliminated promptly without causing damage to the biosignals required .

## References

<http://www.slideshare.net/manishpipra/various-type-o>

<http://www.measurement.sk/2013/Mishra.pdf>

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3690072/>

## Books

Biosignal processing Principles and Practices Edited by Hualou Liang , Joseph D. Bronzino , Donald R. Peterson