

The Blumensaat Line on Lateral Radiograph as a Correlation of ACL Length Measured on MRI

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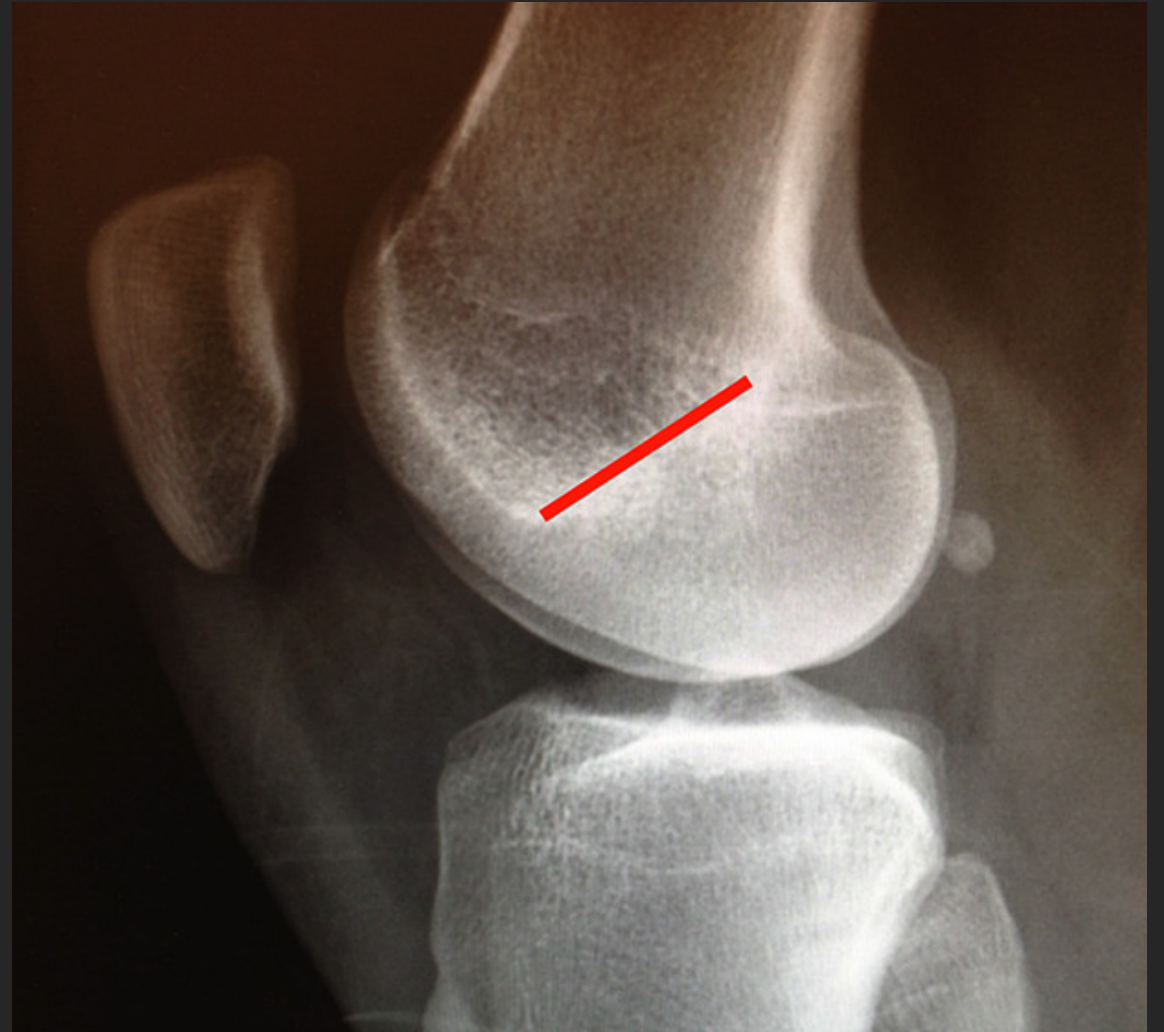
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Purpose

To assess if the Blumensaat line on XR is an accurate measurement of native ACL length compared to traditional MRI measurement

If so, it is an inexpensive and easily accessible method which can be incorporated into preoperative planning of ACL reconstructions



Materials and Methods

- Lateral radiographs and sagittal MRIs from 200 patients with non-ACL injuries were collected
- The Blumensaat line on radiograph and ACL length on MRI were measured by 3 orthopedic surgeons with varying levels of experience. Measurements were compared to assess interobserver reliability.
- Two surgeons conducted these measurements twice each on 50 patients to assess intraobserver reliability

Statistics

- Pearson correlation coefficients were calculated to test for pairwise associations between ACL on MRI and the Blumensaat line on radiograph
- Linear regression models were created to predict ACL length according to the Blumensaat line on radiograph.

Results

- **Interobserver** reliability was 0.86 for the Blumensaat line on radiograph, and 0.71 for the ACL on MRI.
- **Intraobserver** coefficients were 0.94 for radiograph and 0.87 for MRI.
- **Pearson's correlation** found a statistically significant correlation between the Blumensaat line and ACL length on MRI for all reviewers. ($p < 0.0001$).
- There was a significant **linear regression** model when comparing the Blumensaat line to ACL length measured on MRI ($p < .00001$).

Results

	Interobserver Reliability		Intraobserver Reliability	
	Mean ICC	95% CI	Mean ICC	95% CI
BL	0.86	0.82-0.89	0.94	0.91-0.96
MRI	0.71	0.64-0.77	0.87	0.81-0.91

Inter and Intraobserver Correlation Coefficients for both MRI measurements and X-Ray measurements of the Blumensaats Line

	BL on X-ray against ACL on MRI
Pearson Correlation	p <0.001*
	r=0.79
Linear Regression	p <0.0001*
	r ² =0.63
	ACL Length = .772(Blumensaats line) + 8.23

Pearson correlation and linear regression analysis results comparing the Blumensaats line against ACL measurements on MRI.

* indicates a significant correlation between BL on x-ray and ACL on MRI.

Conclusions

The Blumensaat line has already been shown by the senior author to be an accurate predictor of ACL length intraoperatively¹

Our results show that the Blumensaat line on radiograph can be measured as consistently and accurately as ACL length on MRI

The formula produced by our linear regression provides clinicians with an even more accurate prediction of ACL length based on the Blumensaat line measurement

Given these findings, we believe that measuring the Blumensaat line on lateral radiographs is an inexpensive and accessible tool for pre-operative planning for an ACL reconstruction

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