

CAN COMPUTER VISION ALGORITHMS NONINVASIVELY RECOGNIZE ANEUPLOIDY IN BLASTOCYSTS?: "PUMPING" APPEARS TO BE A STRONG PREDICTIVE FEATURE

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INTRODUCTION

Continuous monitoring of the embryo development has brought out morphokinetic parameters that are used to predict pre-implantation genetic testing (PGT) results. However, time-lapse data are currently under-utilized in making predictions about embryo chromosomal content. Artificial intelligence and computer vision could take advantage of the massive amount of data embedded in the images of embryo development.

OBJECTIVE

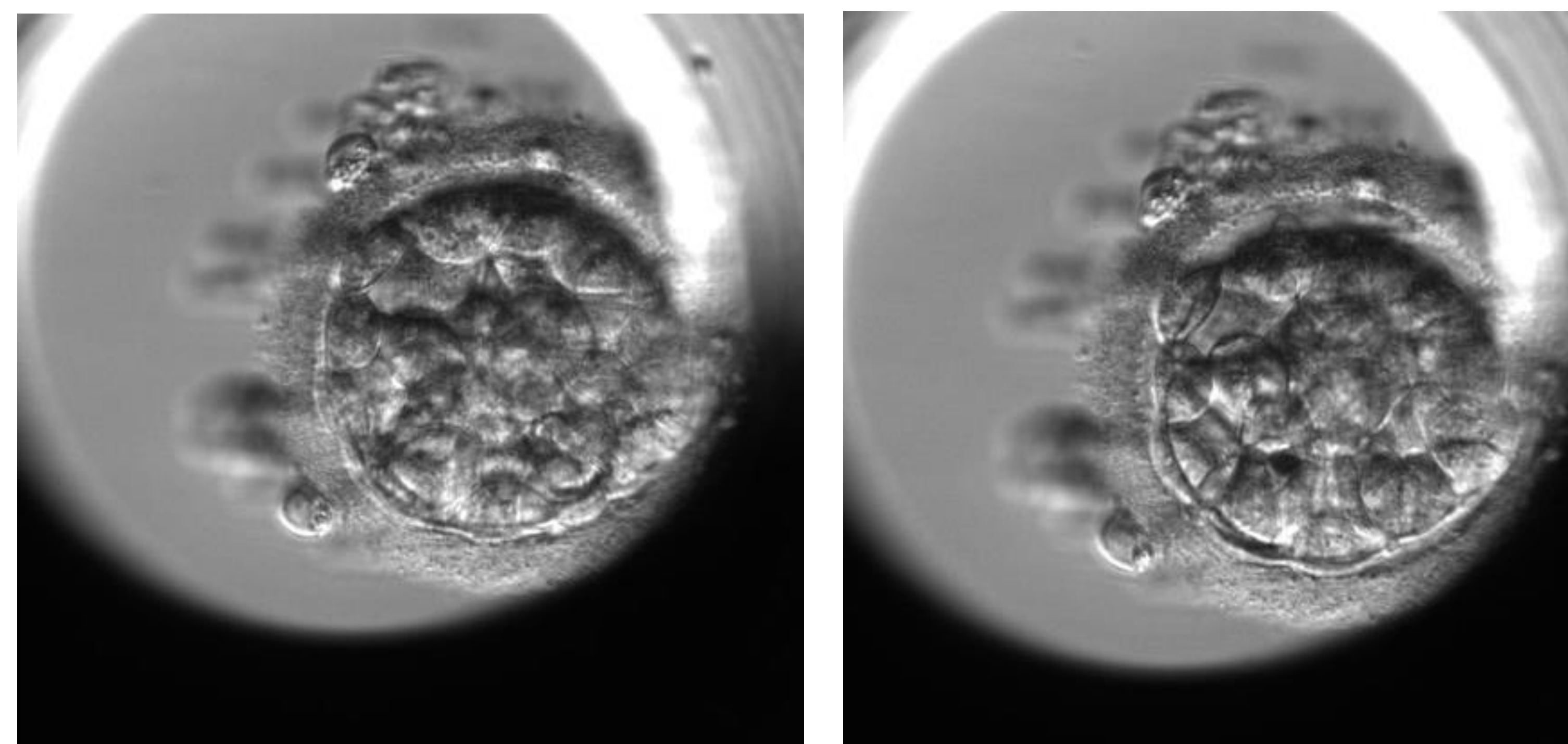
To determine whether "pumping" or "weak contractions," measured by computer vision analysis of time-lapse videos is associated with aneuploidy.

METHODS

Sample size: 697 expanded blastocysts cultured in the EmbryoScope® with preimplantation genetic testing for aneuploidies (PGT-A) results.

COMPUTER VISION ALGORITHM
on 182,345 time-lapse sequences

Blastocyst diameter
(best-fit circle)



RESULTS

TABLE 1.

	Euploid	Aneuploid
N	394 (56.5%)	303 (43.5%)
Pumping Events	24 (6.1%)	41 (13.5%)

EARLY PUMPING EVENT

Blastocyst was up to 140 µm in diameter

LATE PUMPING EVENT

Blastocyst was over 140 µm in diameter

TABLE 2.

Correlation between late pumping events with aneuploidy

	OR	95% CI	P-value
1 Pumping event	2.22	[1.14-4.33]	<0.001
2 Pumping events	2.11	[1.14-6.97]	<0.001
3 Pumping events	2.73	[1.01-7.36]	<0.001
4 Pumping events	5.85	[1.34-25.49]	<0.001

TABLE 3.

Correlation between early pumping events with aneuploidy

	OR	95% CI	P-value
1 Pumping event	2.42	[1.32-5.28]	<0.001
2 Pumping events	2.82	[1.13-6.96]	<0.001
3 Pumping events	2.60	[0.96-7.04]	<0.001
4 Pumping events	5.52	[1.26-24.18]	<0.001

CONCLUSIONS

- Weak blastocyst contractions ("pumping") occurs more than twice as often in aneuploid blastocysts.
- Computer vision seems helpful as a non-invasive tool for deselecting blastocysts for transfer.