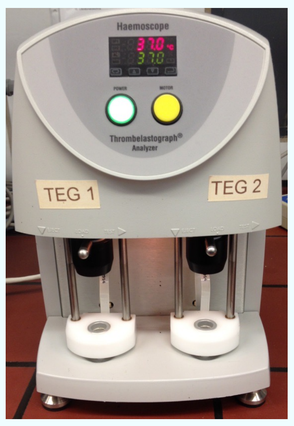

Reference intervals and influence of sampling technique on canine TEG velocity curve variables and delta

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Introduction

Thrombelastography (TEG) evaluates the overall clotting properties of whole blood. The velocity curve (VC) represents the TEGs first mathematical derivative$_1$ and generates additional variables: maximum rate of thrombus generation (MRTG), time to maximum rate of thrombus generation (TMRTG) and thrombus generation (TG) (see Figure 1a)$_2$. These variables further characterise the clotting process. Delta, another novel variable, represents the difference between the reaction time (R) and the split point (SP) of the TEG (see Figure 1b). Delta evaluates the initial phase of thrombin generation and may thus be helpful to discern the pathophysiology of hypercoagulable states (platelet activation vs. plasmatic hypercoagulability)$_3$.
No Reference intervals (RIs) for canine VC variables and Delta have been generated, neither has a possible effect of the sampling method been evaluated.

Objectives

1. Calculation of RIs for novel TEG variables.
2. Evaluate the effect of different sampling techniques on VC variables, Delta and SP.

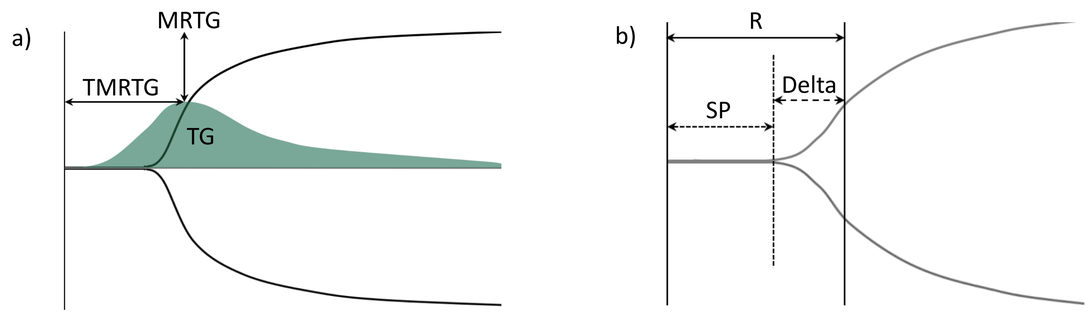

Figure 1:
a) TEG curve (black line) with superimposed velocity curve (green) and its variables: maximum rate of thrombus generation (MRTG), time to maximum rate of thrombus generation (TMRTG) and thrombus generation (TG)
b) Depicts the relationship of Delta from reaction time (R) and split point (SP). Delta = R - SP

Materials and Methods

Thrombelastography:
- 1 h after blood sampling
- Citrated whole blood (9:1)
- Kaolin activation
- TEG® 5000 (Haemonetics)
- TEG Software Version 4.3
- Calculation of VC variables was based on clot strength (G)

1. Establishment of reference intervals:
- Retrospective data analysis
- Fifty six healthy dogs (31 male, 25 female)
- Aged 1- 6 year (mean 2 years)
- Duplicate measurements to evaluate pooled variance

Statistical analysis: ReferenceValue Advisor 2.1$_4$ was used to calculate RIs via the robust method. Coefficients of variation were determination from pooled variance.

2. Effect of blood sampling method:
- Retrospective data analysis
- Six healthy Beagle dogs (4 male, 2 female)
- Aged 2-3 years (mean 2.5 years)
- Sampling techniques:
  1. 20-gauge intradermic needle
  2. 18-gauge venous catheter
  3. 14-gauge central venous catheter (Seldinger technique)
  4. 13-gauge central venous catheter (catheter-through-the-needle technique)

Statistical analysis: The effect of sampling method was analysed via the Friedmann test using GrapPad Prism 6. The level of significance was set at p = 0.05.

Results

1. Reference intervals and CVs for Delta and VC variables of thrombus generation were as follows:

Variable (Unit)	**MRTG** (dyn/cm²/s)	**TMRTG** (min)	**TG** (dyn/cm²)	**Delta** (min)	**SP** (min)
RI	0.78 – 8.0	3.2 – 15.9	326 - 1036	0.0 – 1.3	1.1 – 7.6
CV (%)	23.3	11.2	8.1	25.0	8.1

2. Effect of sampling technique:
The TEG VC variables, Delta and SP were not significantly affected by the different sampling techniques (see Figure 2).

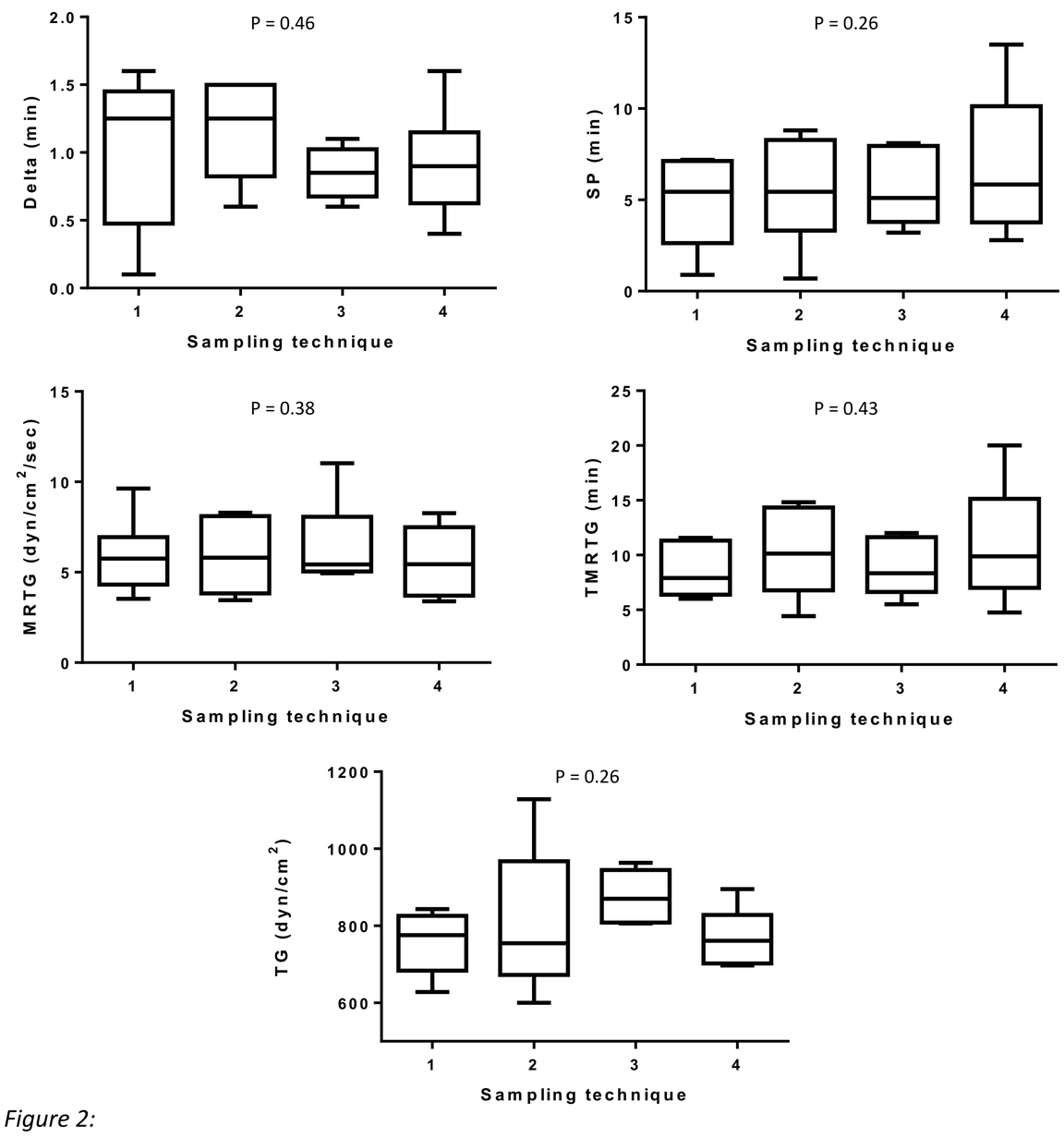

Figure 2:
Box-and-whisker plots for TEG velocity curve variables, Delta and SP. Central horizontal line, whiskers and box represent the median, range and interquartile range respectively.

Conclusion

Reference Intervals for VC variables and Delta were established. Relatively high CVs of MRTG and Delta need to be considered when interpreting results.
A significant difference between sampling methods was not detectable, however, due to the small samples size occurrence of a type II error has to be considered.

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