

Risk of Ankylosis in Children with Permanent Tooth Intrusion Injuries

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PURPOSE: To evaluate the risk and onset of ankylosis in permanent teeth following dental intrusion injuries based on a variety of risk factors including: the severity of the injury, the maturation status of the root, and the initial treatment provided.

BACKGROUND:

- Intrusion injuries are one of the most severe and rare injuries contributing to only 0.5-2.0% of all dental injuries
- There are many common complications which can result from the injury; the most severe being replacement resorption or ankylosis
- Ankylosis can be diagnosed from a combination of both clinical and radiographic findings and is influenced by a patient's growth

METHODS:

- A Retrospective chart review was completed from the years 2013-2021
- Patients who had sustained a permanent tooth intrusion injury and were treated at Nationwide Children's Hospital were included
- Teeth extracted within 7 days post-injury were excluded
- Kaplan-Meier survival analysis was conducted to estimate the survival probability at 1 and 2 years post-injury

RESULTS:

- A total 154 teeth of 114 patients met the inclusion criteria
- Majority of patients were 6-11 years old at the time of injury
- Patient's averaged 5 follow-up visits for an average of 469 days post-injury

DISCUSSION:

- A large sample size was reported in comparison to previous studies
- Comprehensive trauma care encompassing all specialties was completed in one setting so there was structured data collection and the most recent International Association of Dental Traumatology Guidelines were routinely followed
- Limitations include: multiple providers with lack of calibration, possible inaccurate assessment of severity of intrusion especially in patients with partially erupted dentition, and patients who may have not returned for follow-up appointments

CONCLUSIONS:

- The risk of ankylosis in permanent intruded teeth was directly associated with increasing severity of intrusion, root maturation and whether the tooth was repositioned surgically
- Most diagnoses of ankylosis can be made within 2 years post-injury
- Roughly half of the teeth did not ankylose within 2 years following the injury

REFERENCES:



Variable	N (%)
Age	
6-11	94 (82%)
12-17	19 (17%)
18-21	1 (1%)
Gender	
Male	69 (61%)
Female	45 (39%)
Tooth Maturity	
Immature	89 (58%)
Mature	65 (42%)
Severity	
Not assessed	3 (2%)
1-3 mm	80 (52%)
4-6 mm	23 (15%)
>6 mm	48 (31%)
Primary Treatment	
Spontaneous eruption	101 (65%)
Orthodontic	1 (1%)
Surgical	52 (34%)

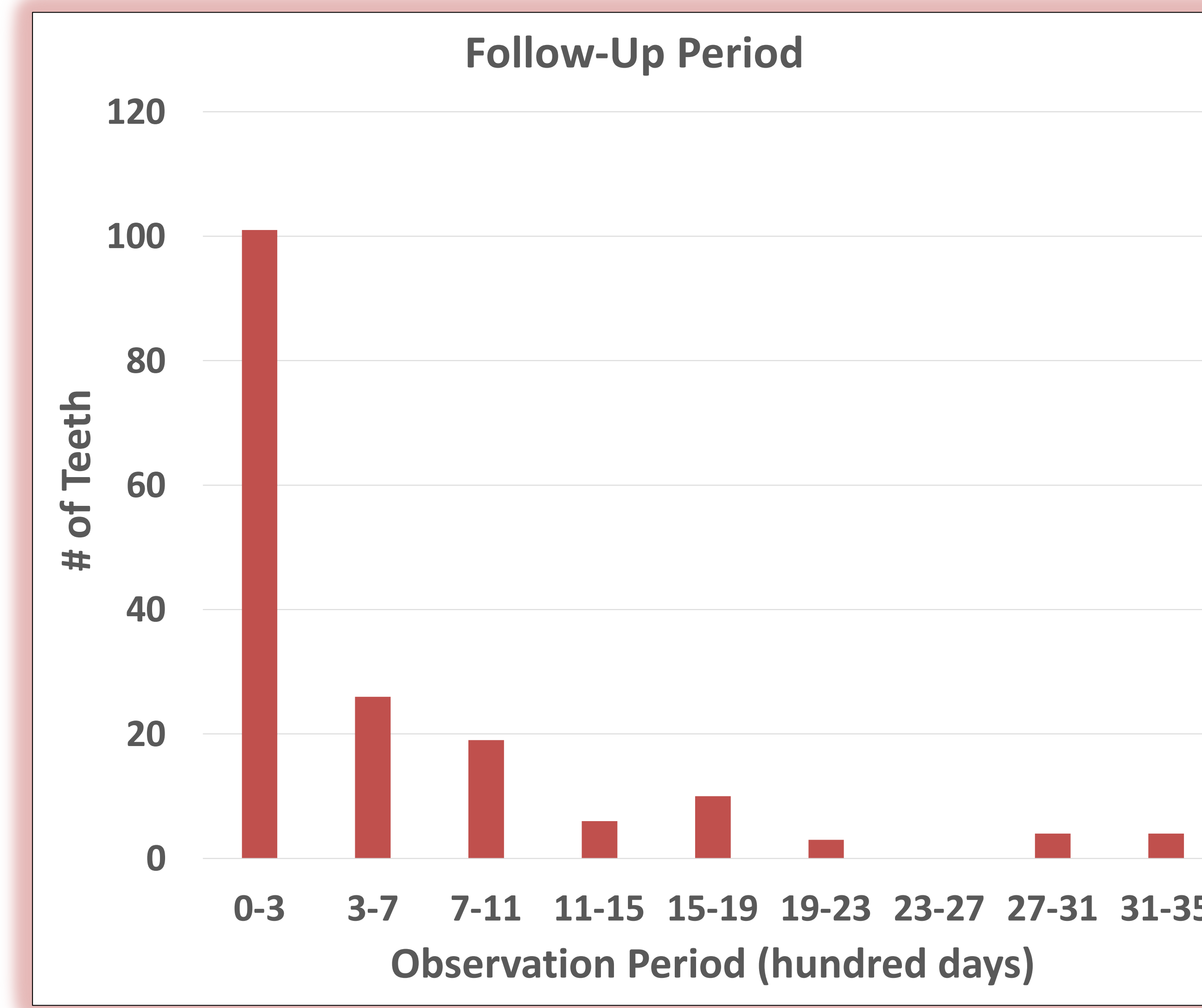


Figure 1: Bar graph of the number of teeth assessed over the given time frame.

Characteristic	1-Year Survival Probability (95% C.I)	2-Year Survival Probability (95% C.I)
Tooth Maturity		
Immature	95% (89%, 100%)	91% (82%, 100%)
Mature	72% (59%, 89%)	47% (30%, 73%)
Severity		
1-3mm	94% (86%, 100%)	83% (69%, 100%)
4-6mm	91% (75%, 100%)	76% (51%, 100%)
>6mm	71% (57%, 89%)	55% (38%, 80%)
Primary Treatment		
Spontaneous	96% (90%, 100%)	92% (83%, 100%)
Surgical	69% (55%, 87%)	42% (25%, 71%)

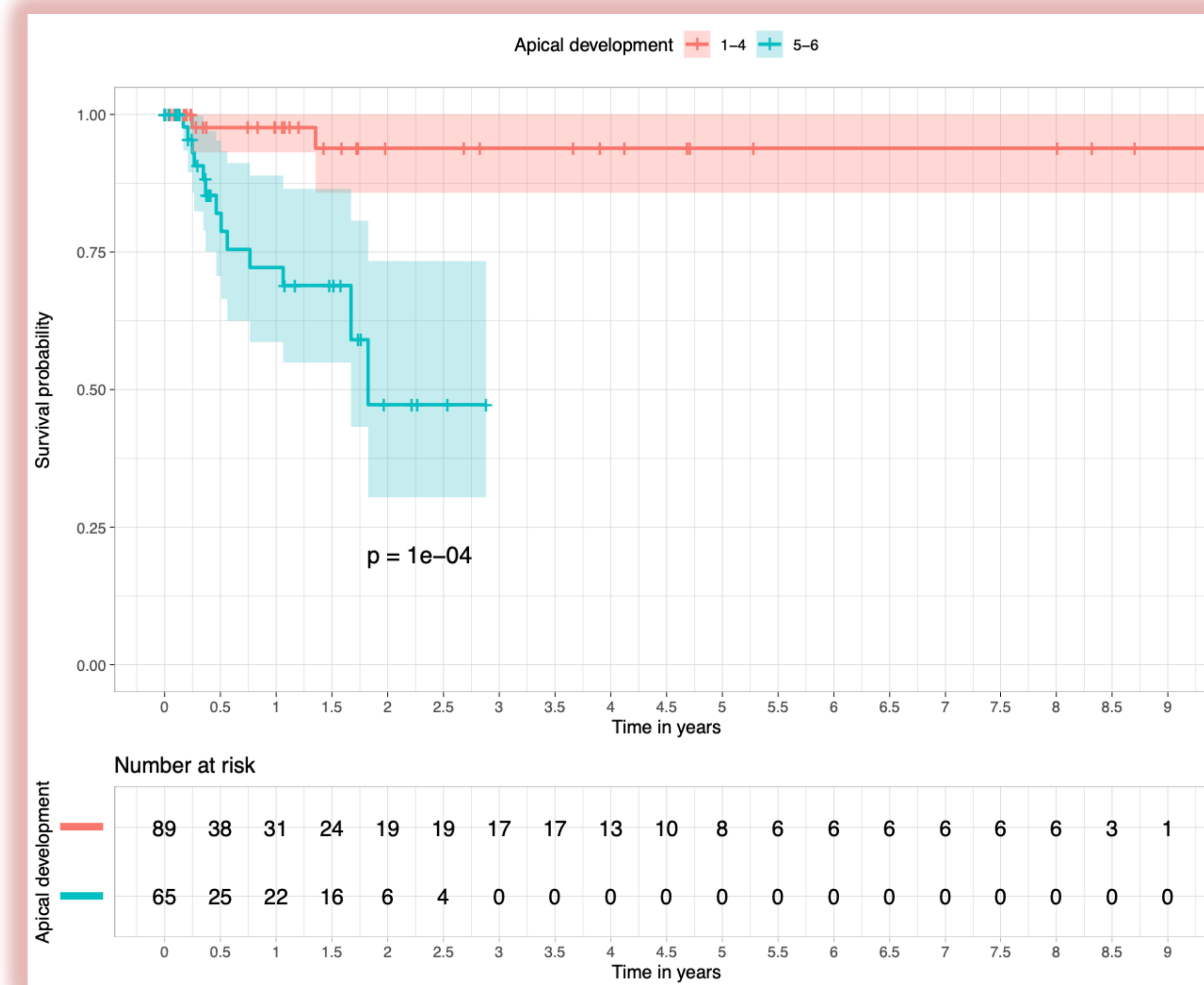


Figure 2: Kaplan-Meier analysis of ankylosis in relation to the status of apical development. Immature teeth (1-4) and mature teeth (5-6) were categorized according to Moorrees classification. The risk for ankylosis is significantly higher in mature teeth.

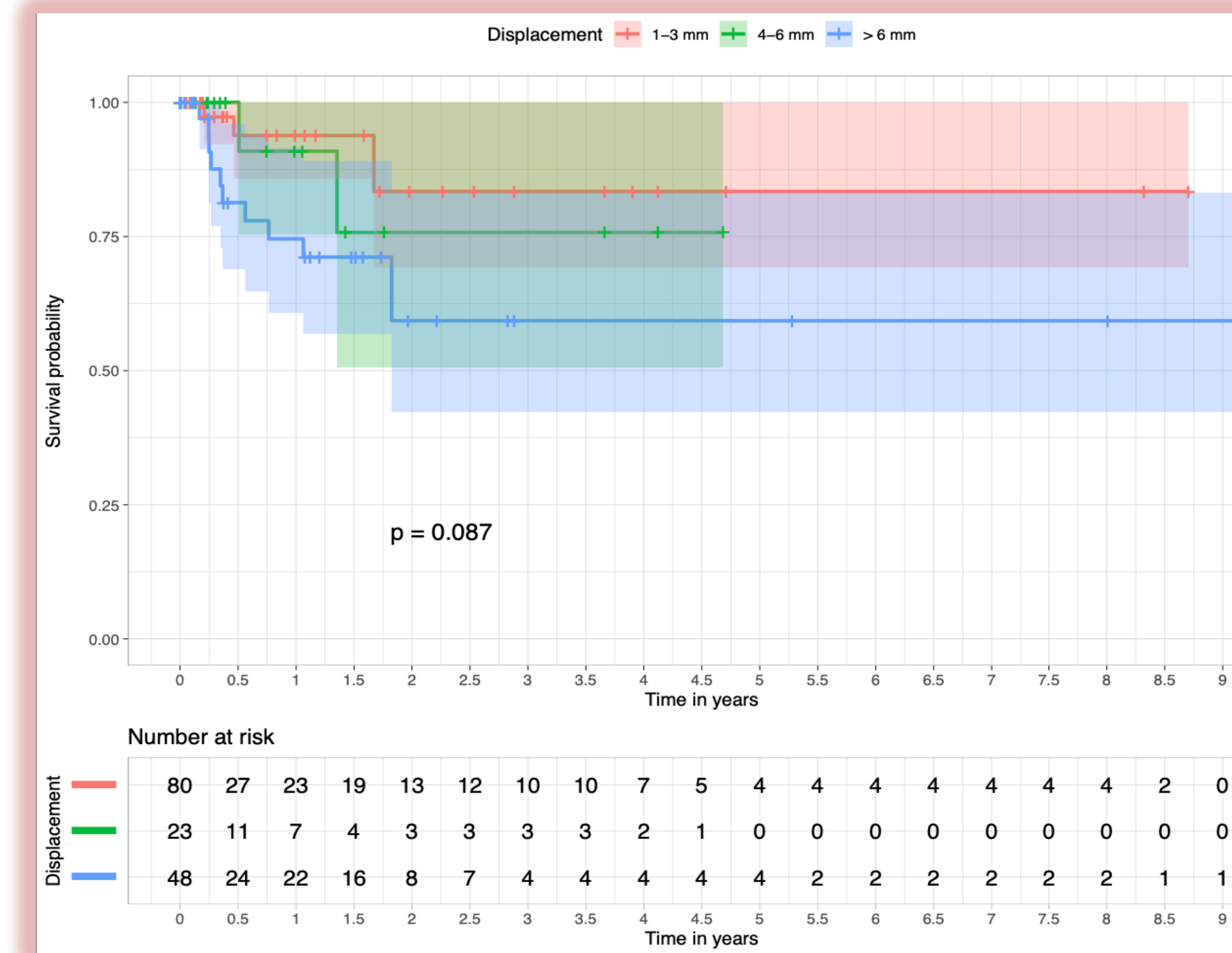


Figure 3: Kaplan-Meier analysis of ankylosis in relation to the severity of injury. Risk of ankylosis is highest in teeth which were severely intruded (>6 mm).

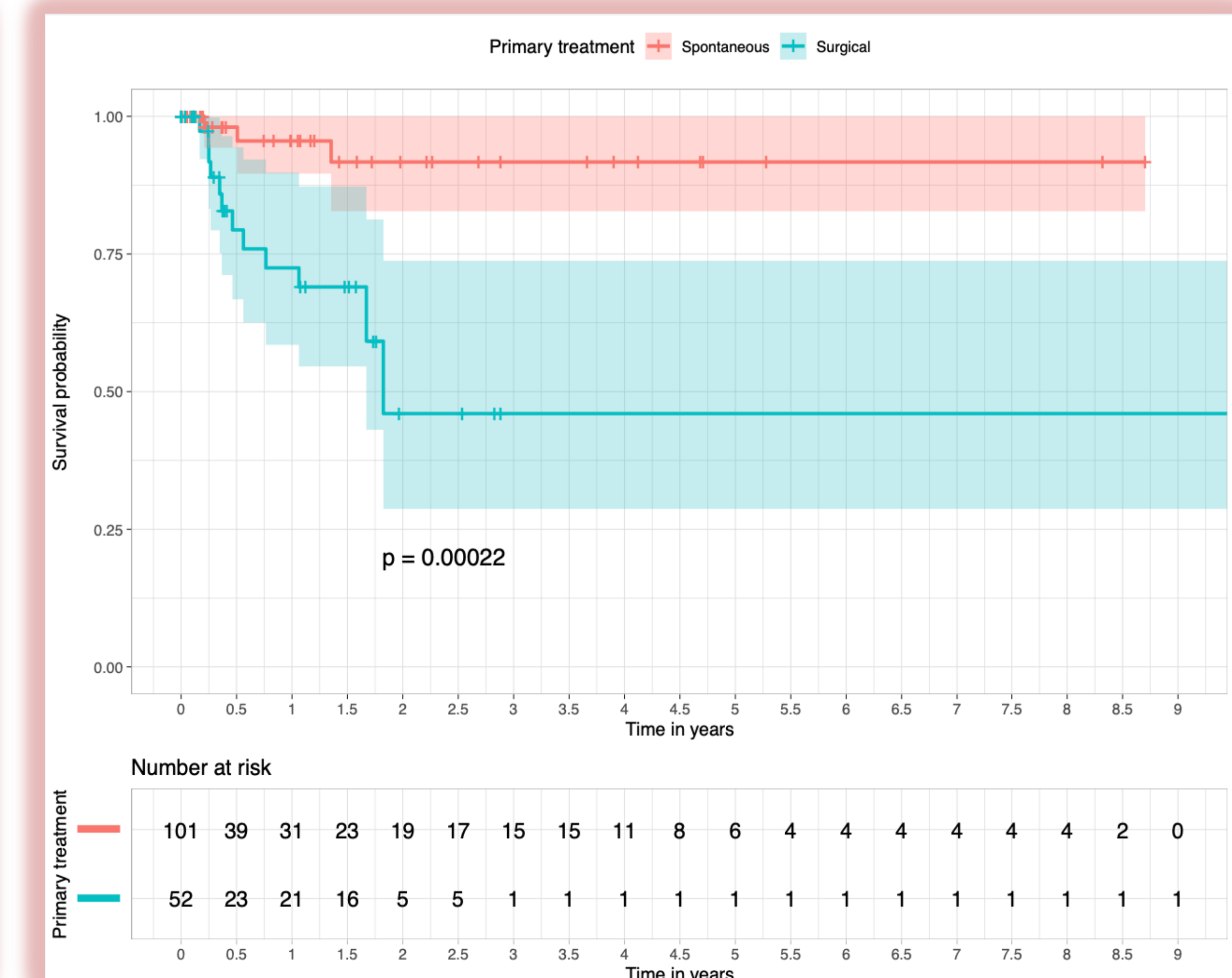


Figure 4: Kaplan-Meier analysis of ankylosis in relation to primary treatment provided. The risk for ankylosis is higher in teeth which had undergone surgical repositioning.