

# Study on Cleanliness of Loan Instruments by Adenosine Triphosphate

Kazumi Tanaka<sup>\*1)\*2)</sup>, Hiroyoshi Kobayashi<sup>\*1)</sup>, Rika Yoshida<sup>\*1)</sup>

<sup>\*1)</sup>Perioperative Healthcare Safety and Management Tokyo Healthcare University Postgraduate School

<sup>\*2)</sup>Kinki University Hospital

## 1. Introduction

Loan Instruments (LI) is unavoidable in orthopedic implant surgery. In the Guideline of Japanese Society for Operating Medicine 2008, it is recommended to wash LIs before and after using in clinical settings and also after returning to suppliers<sup>1)</sup>. However, in a report of surveillance, it is mentioned that the cleaning is in fact insufficient to be carried out<sup>2)</sup>. Adenosine triphosphate (ATP) measurement of the contaminants on LIs just after receiving from suppliers and after washing in a Japanese hospital was examined in order to evaluate practical cleanliness of LIs.

## 2. Methods

From 16 November 2011 to 6 June 2012, We examined 149 LIs immediately after receiving from the suppliers and 157 LIs after washing in clinical settings in Kinki University Hospital on the ATP values by the measurement reagent (UXL100 clean trace<sup>TM</sup>, 3M) and luminometer (3M<sup>TM</sup> Clean-Trace<sup>TM</sup> LuminometerUNG3, 3M). The measured parts were the plain part, the narrow space, inside the connecting part, the tip, crevice, and the uneven part of the instruments. Also we examined the existence of protein and hemoglobin using urinalysis paper.

## 3. Results

7.0% of LIs after washing and 38.9% of LIs immediately after receiving showed more than 100 Relative Light Unit (RLU)(Fig.1). More than 100 RLU of ATP values was observed on many of both uneven and even parts immediately after receiving and also after washing(Fig.2). And contaminants were found in the tip and crevice just after receiving, and in narrow space and crevice after washing. Most of them, however, were not found visually. In the result of observation with urinalysis paper, weak correlation of hemoglobin and ATP values was identified(Fig.3-4).

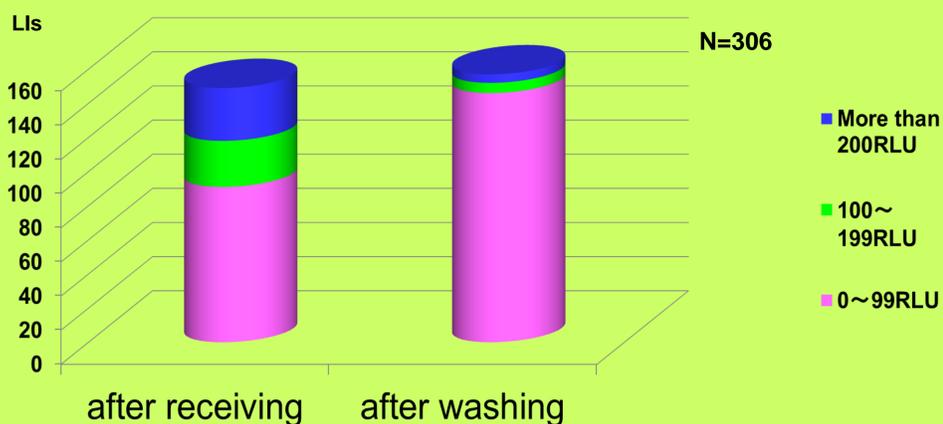


Figure 1. More than 100RLU of ATP values LIs

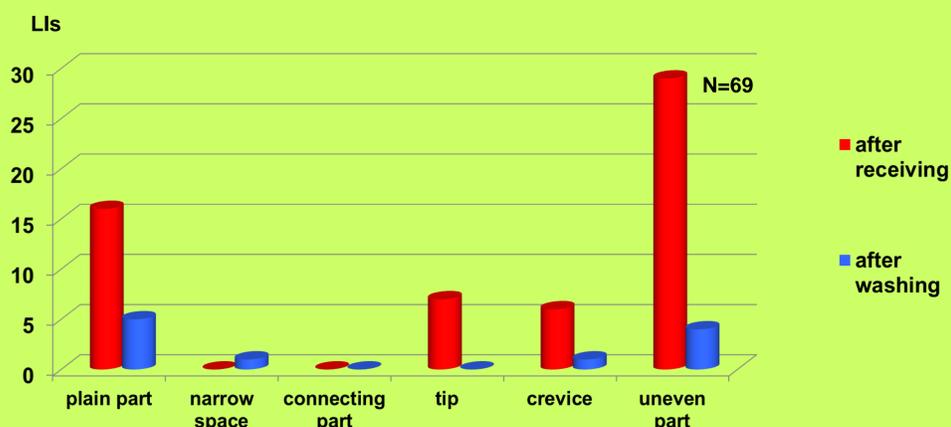


Figure 2. More than 100RLU of ATP values part of LIs

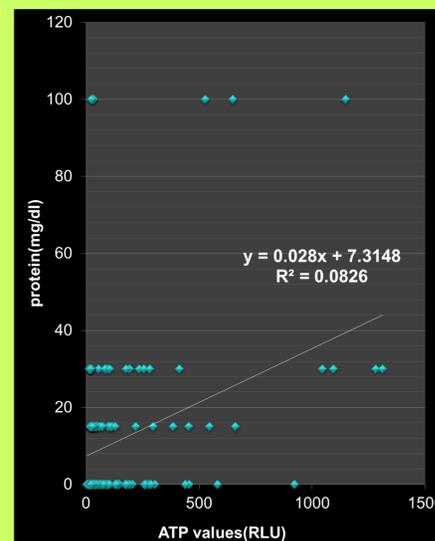


Figure 3. Correlation of protein and ATP values.

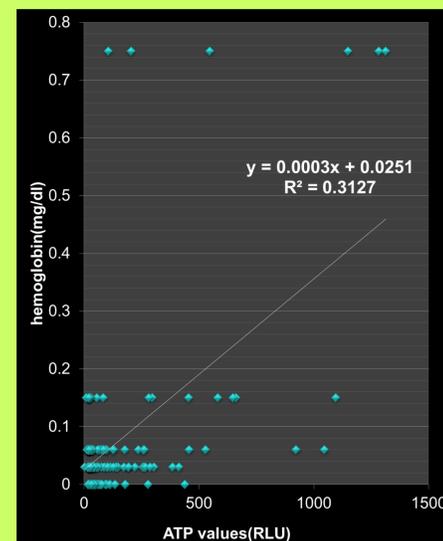


Figure 4. Correlation of hemoglobin and ATP values.

## 4. Discussion

The ATP measuring is said as the judging method for the instrument contaminants in routine work<sup>3)</sup>. But the common standard value is not shown by the supplier. Therefore, it is crucial to determine a standard value in each medical facility. From those results of our investigation, more than 100RLU is decided to be the standard value in Kinki University hospital. The contaminants in crevice and on uneven parts of LI cannot be recognized visually. So chemical evaluation is required. In the results of ATP measurements, 100 RLU values were observed on many uneven parts. Therefore, the uneven part can serve as the index of contamination evaluation. The swab stick for ATP measurement was too large for a crevice. For the evaluation of such small parts, a suitable investigation tool must be developed in the future. Correlation between urinalysis paper and ATP values was not significant. However, urinalysis paper can evaluate a mild contamination<sup>4)</sup> and is acceptable as a cheap and simple method.

## 5. Conclusion

Rather higher rate of contaminations were found among both LIs immediately after receiving from suppliers and after washing in clinical settings, however, they were not easily found visually. A further careful study is necessary on the residual contaminants of LIs. It is required for contaminant evaluation of LIs to choose the suitable way for the shape of the instruments and to evaluate the index instruments among LI set as well.

## References

- 1.Kobayashi H, Takeuchi C, Kubo H, Okazaki E, Hushimi R. Loan Instrumen. *Jpn J Op Med* 2013; 34 Suppl: S83-S88.( in Japanese)
- 2.Okazaki E, Kobayashi H: Cleaning of Loan Instruments before use in clinical settings. *Journal of Healthcare-associated Infection* 2010. 1. 14-17.(in Japanese)
- 3.Guideline for Cleaning and Decontamination of Reusable Instruments 2004 : *Hospital Supply*. 2004; 9: 11-14. (in Japanese)
- 4.Okazaki E, Kobayashi H: The examination about the contamination of Loan Instruments: The trial of the qualitative evaluation with the urine analysis test paper. *Journal of Healthcare-associated Infection* 2011. 2. 25-28. (in Japanese)