

Shoulder and Elbow pain in Young Baseball players

- Our observation from a nationwide questionnaire survey -

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Baseball is one of the most popular sports in Japan as well as South Korea and United States of America and many boys enjoy playing baseball.

Although baseball is believed to be one of the safest team sports, many studies show that there are still a significant number of shoulder and elbow injuries.



The proposal about the baseball injury of youth (1)

Japanese Society for Clinical Sports Medicine (1995)

- 1. The peak age of baseball elbow is 11 to 12 years old. Therefore, the baseball coaches should pay special attention to the elbow pain and the restriction of movement for the schoolchildren of this age bracket. The peak age of baseball shoulder is 15 to 16 years old. Attention should be paid especially to the shoulder pain and the change of pitching form.**
- 2. The baseball elbow and baseball shoulder are experienced most frequently by pitchers and catchers. Therefore, each team should train and have two or more pitchers and catchers respectively.**
- 3. The training days and hours for elementary schoolchildren shall not exceed three days a week and two hours a day. Junior and senior high school students shall have at least one day of rest per week. The amount and content of training shall be adjusted according to the growth, physical strength, and skill of each player.**

The proposal about the baseball injury of youth

Japanese Society for Clinical Sports Medicine (1995)

- 4. The number of full-power pitches for schoolchildren shall be 50 or less per day, and 200 or less per week including the games. The number of full-power pitches for junior high school students shall be 70 or less per day, and 350 or less per week. The number of full-power pitches for senior high school students shall be 100 or less per day, and 500 or less per week. A pitcher shall not play two or more games a day.**
- 5. Before and after the training, sufficient time shall be allocated for warm up and cool down.**
- 6. Coaches should give players an off-season period and an opportunity to enjoy sports other than baseball.**
- 7. The baseball elbow and baseball shoulder are likely to cause a serious sequela in the future. Therefore, to prevent it, the periodical medical checkup should be done by medical specialists who have close contact with coaches.**

The proposal about the baseball injury of youth

Japanese Society for Clinical Sports Medicine (1995)

| | Elementary School | Junior High School | Senior High School |
|--------------------|--------------------------|---------------------------|---------------------------|
| Days / week | 3 d /W | 6 d/W | 6d /W |
| Hours | 2 hr/d | Rest | Rest |
| | | >1 d/w | >1 d/w |
| Pitches | 50/d | 70 /d | 100/d |
| | 200/w | 350/w | 500/w |

Baseball injury



slipped proximal humeral epiphysis



Osteochondritis dissecans of the elbow

- In March 2010, a winning pitcher of the title-deciding game in one of the major tournament supported by Minister of Education, Culture, Sports, Science and Technology, could not throw a ball due to shoulder and elbow pain. He played alone as a pitcher in five games of the tournament for three consecutive days.

Meeting with Orthopaedic Surgeons and delegates from all amateur baseball federations



(2014.3.15)

**A Questionnaire Survey on Baseball Player activities
in Elementary Schoolchildren**

by

**Baseball Federation of Japan
Japan Orthopaedic Association
Bone and Joint Decade Japan**

Purpose of the study

- **To examine prevalence of shoulder and elbow pain in elementary school students,**
- **To examine Risk factor of shoulder and elbow pain**

Method and subjects

- a questionnaire survey in 2014
- 539 coaches and 10,228 players.
- At least ten teams of the Japan Rubber Baseball Association from each prefecture, participated in the survey.
- The age of youth baseball players ranged from 6 to 13 years with a median age of 11 years.

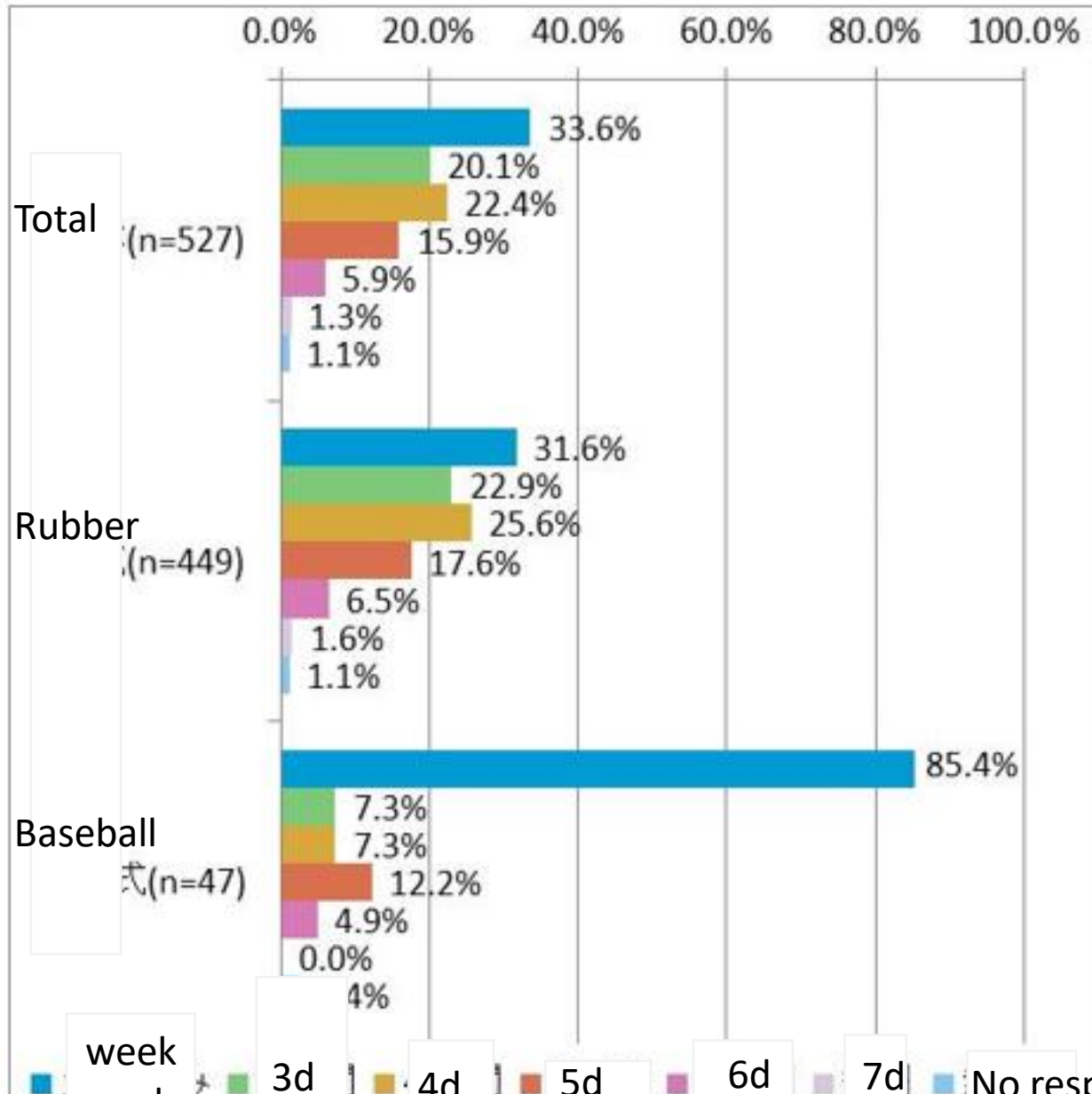
- **a cross-sectional study of coaches and players of youth baseball teams.**
- **Two questionnaires 1 targeting coaches and 1 targeting young baseball players**
- **These questionnaires were distributed to teams that belong to Japan Rubber Ball Association and several hardball baseball association between July 2014 and January 2015..**

Cooperating Associations

| | Kind of Ball | No. of Team | No. of Players |
|--|-----------------|-------------|----------------|
| Japan Rubber Baseball Association | Rubber baseball | 12,663 | 253,260✕ |
| Japan Little League Baseball Association | Baseball | 725 | 18,000✕ |
| Boy's league | Baseball | 141 | 2,113 |
| Pony Baseball | Baseball | 5 | 57 |
| Young Baseball League | Baseball | 19 | 195 |
| Fresh League | Baseball | 20 | 333 |
| total | | 13,573 | 273,958 |

Amount of Practice per week

Proposal: within 3 days a week in Elementary schoolchildren



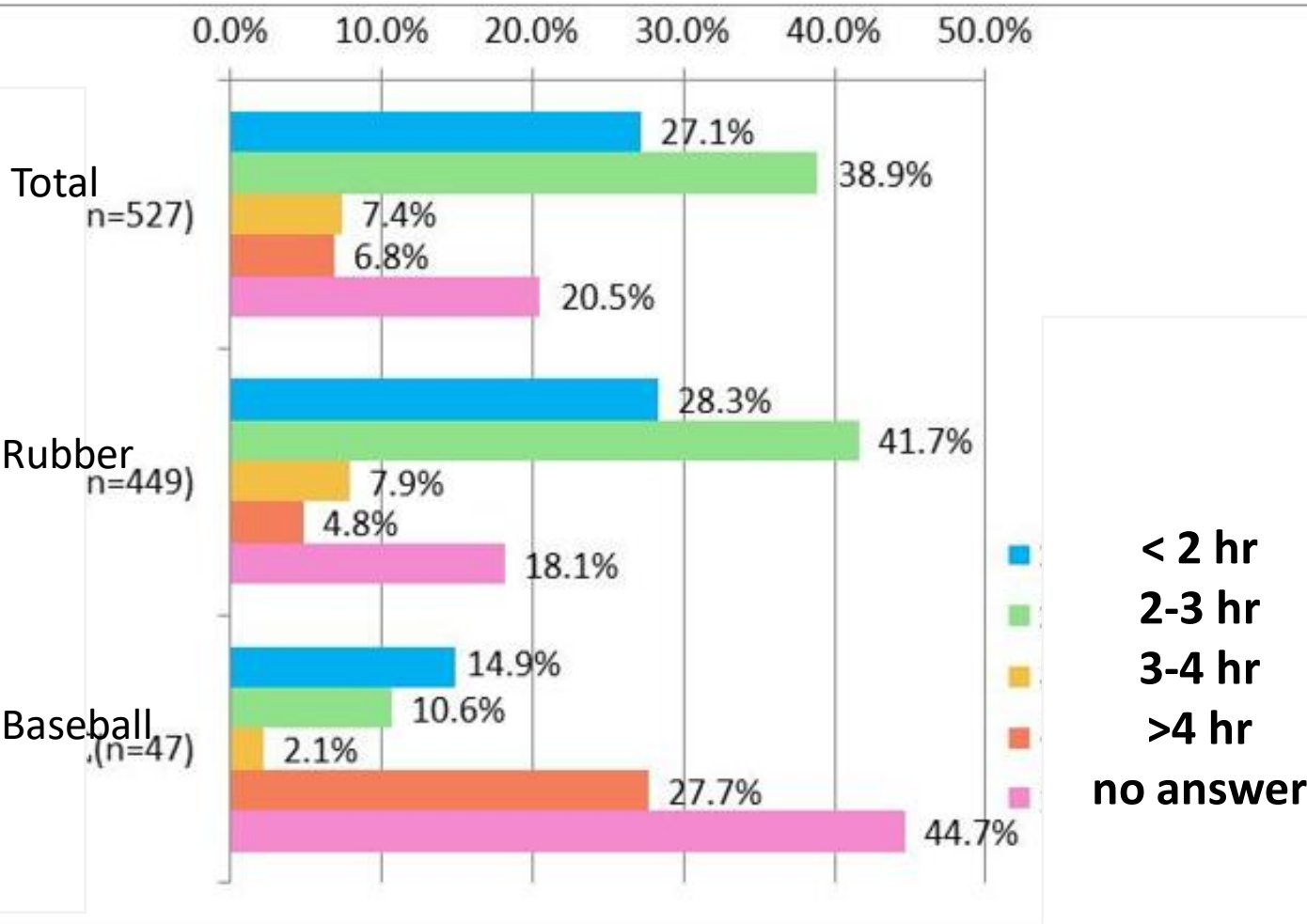
- weekends only : 33.6%
 - The most common response
 - baseball : 85.4% (35 teams)
 - Rubber ball : 31.6% (142 teams)

- Practice 4 or more days a week:
 - Rubber: 51.2% (230 teams)
 - Baseball : 24.4% (10 teams)

- Not in compliance with proposal

Hours of Practice on weekdays.

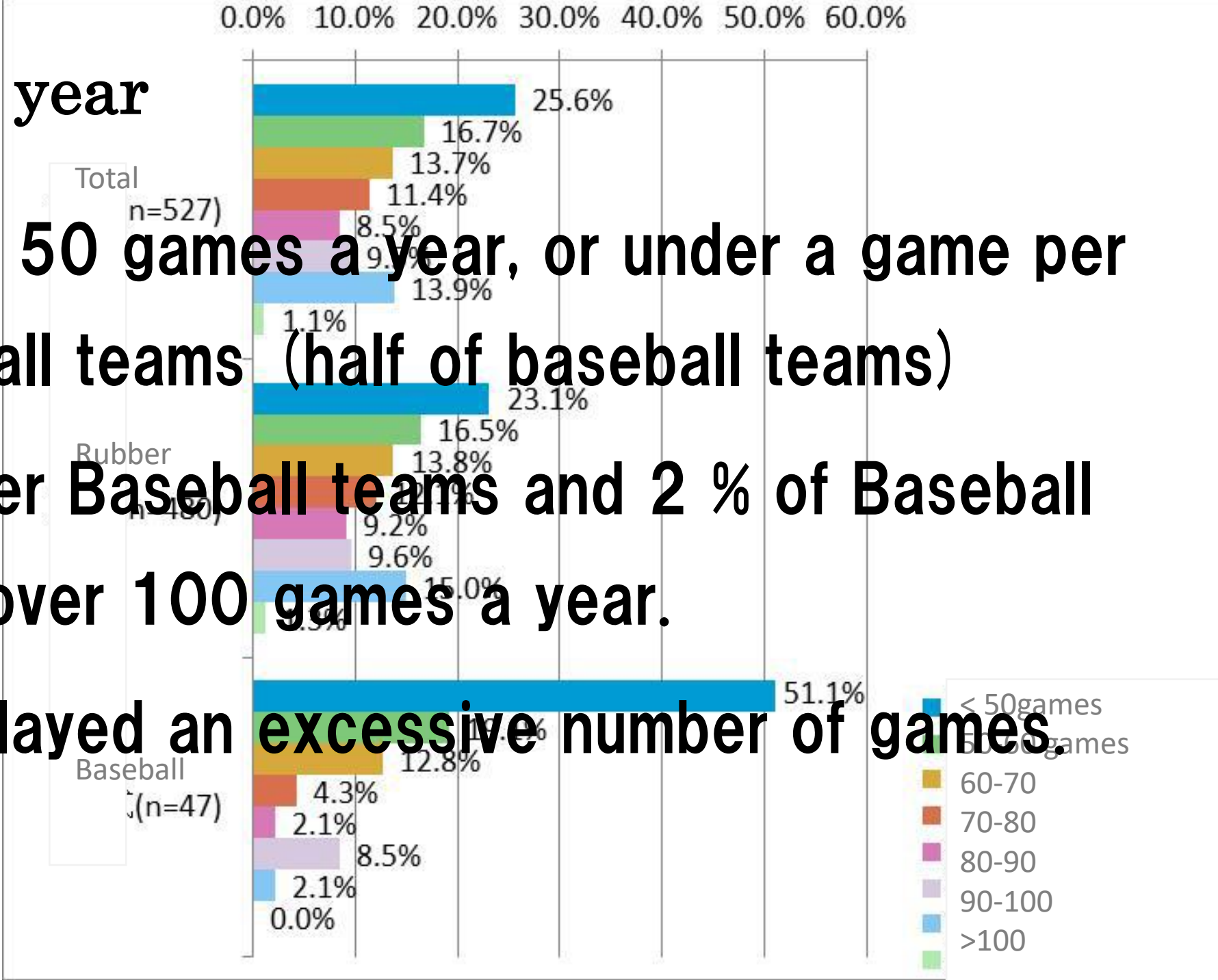
Proposal: no more than 2 hours a day for Elementary School students



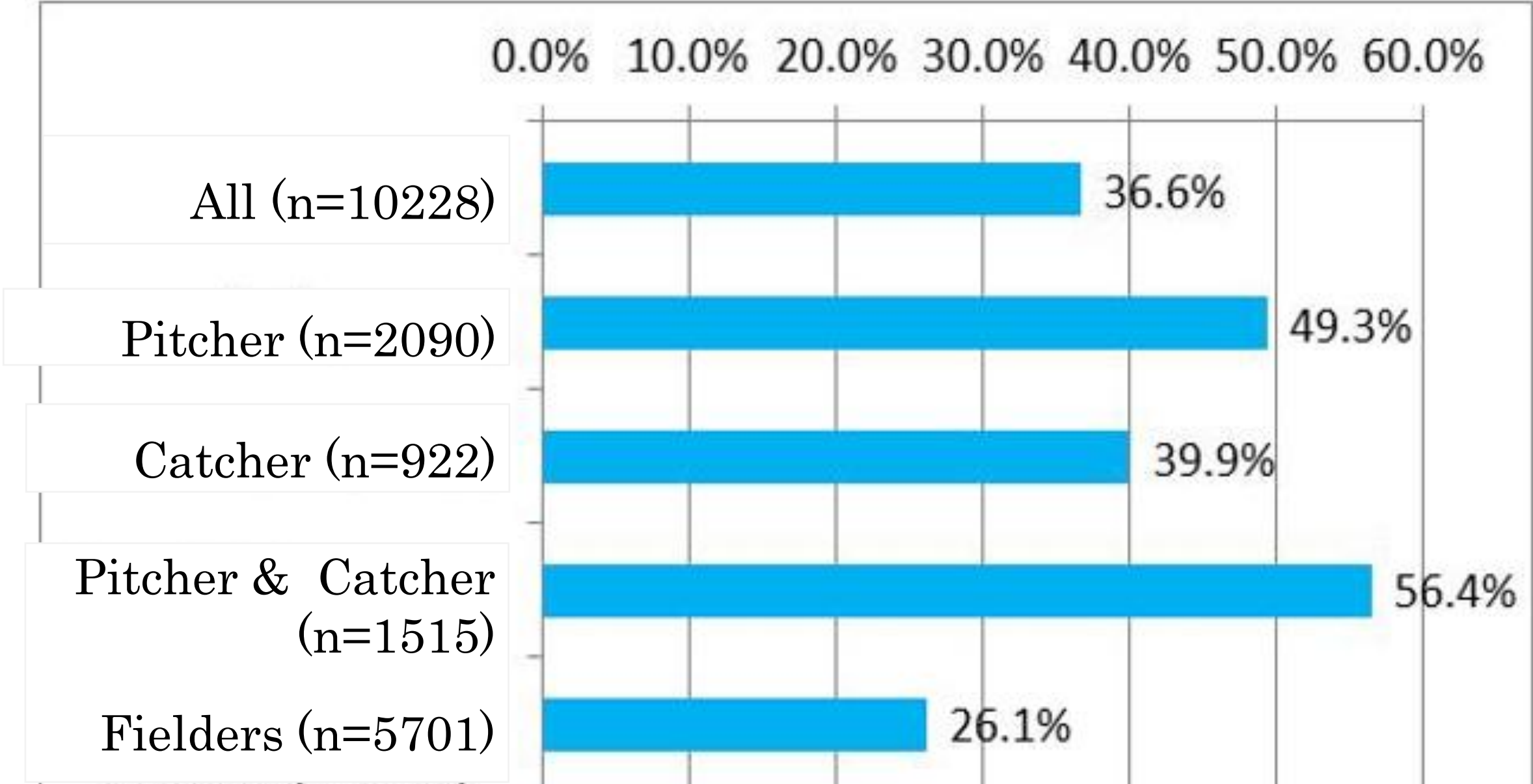
- **<2hr/a day: 27.1%**
in compliance of the proposal
- **2-3 hours/a day: 38.9%**
The most common response

No. of games per year

- ✓ Play less than 50 games a year, or under a game per week: 1/4 of all teams (half of baseball teams)
- ✓ 15 % of Rubber Baseball teams and 2 % of Baseball teams played over 100 games a year.
- ✓ Many teams played an excessive number of games.



No. of players who experienced shoulder and elbow pain



Pitch counts per day

Proposal: Pitch counts should be less than 50 a day for elementary school students

Pitcher (n=2,090)

| Pitch counts | all | With pain | Shoulder & elbow pain |
|--------------|-------------|-------------|-----------------------|
| < 50 | 618 (29.6%) | 407 (65.9%) | 294 (47.6%) |
| 50 ~ 99 | 517 (24.7%) | 351 (67.9%) | 253 (48.9%) |
| 100 ~ 149 | 250 (12.0%) | 184 (73.6%) | 137 (54.8%) |
| 150 ~ 199 | 92 (4.4%) | 60 (65.2%) | 45 (48.9%) |
| 200 ~ 249 | 43 (2.1%) | 35 (81.4%) | 25 (58.1%) |
| >250 | 27 (1.3%) | 17 (63.0%) | 15 (55.6%) |
| No answer | 543 (26.0%) | 374 (68.9%) | 261 (48.1%) |

Pitch counts per week in Pitcher (n=2,090)

Proposal: less than 200 pitches per week including games

| Pitch counts | All | With pain | Shoulder & elbow pain |
|--------------|-------------|-------------|-----------------------|
| < 50 | 618 (29.6%) | 407 (65.9%) | 294 (47.6%) |
| 50 ~ 99 | 517 (24.7%) | 351 (67.9%) | 253 (48.9%) |
| 100 ~ 149 | 250 (12.0%) | 184 (73.6%) | 137 (54.8%) |
| 150 ~ 199 | 92 (4.4%) | 60 (65.2%) | 45 (48.9%) |
| 200 ~ 249 | 43 (2.1%) | 35 (81.4%) | 25 (58.1%) |
| >250 | 27 (1.3%) | 17 (63.0%) | 15 (55.6%) |
| No answer | 543 (26.0%) | 374 (68.9%) | 261 (48.1%) |

No of days of Practice for Position players (n=5,701)

Proposal: Under 12, 3 days /w & 2 hs/d

| | days | all | With pain | Shoulder & elbow pain | |
|---|--------------|---------------|-------------|-----------------------|-------------|
| | Only weekend | 1,660 (29.1%) |) 50 | 815 (49.1%) | 463 (27.9%) |
| | 3 days | 1,192 (20.9%) | | 525 (44.0%) | 278 (23.3%) |
| ↑ | 4 days | 1,318 (23.1%) | 633 (48.0%) | 333 (25.3%) | |
| | 5 days | 954 (16.7%) | 437 (45.8%) | 244 (25.6%) | |
| ↓ | 6 days | 317 (5.6%) | 163 (51.4%) | 87 (27.4%) | |
| | everyday | 77 (1.4%) | 40 (51.9%) | 29 (37.7%) | |
| | No answer | 183 (3.2%) | 97 (53.0%) | 55 (30.1%) | |

Duration of off-season (catcher)

| | Duration of Season-Off | all | With pain | Shoulder & elbow pain |
|---|------------------------|------------|------------|-----------------------|
| | Not decided | 282(30.6%) | 179(63.5%) | 107(37.9%) |
| | 1 month | 106(11.5%) | 65(61.3%) | 48(45.3%) |
| ↑ | 2 months | 232(25.2%) | 172(74.1%) | 107(46.1%) |
| | 3 months | 186(20.2%) | 107(57.5%) | 60(32.3%) |
| ↓ | 4 months | 85(9.2%) | 45(52.9%) | 34(40.0%) |
| | No answer | 31(3.4%) | 18(58.1%) | 12(38.7%) |

Experience of Shoulder and elbow pain

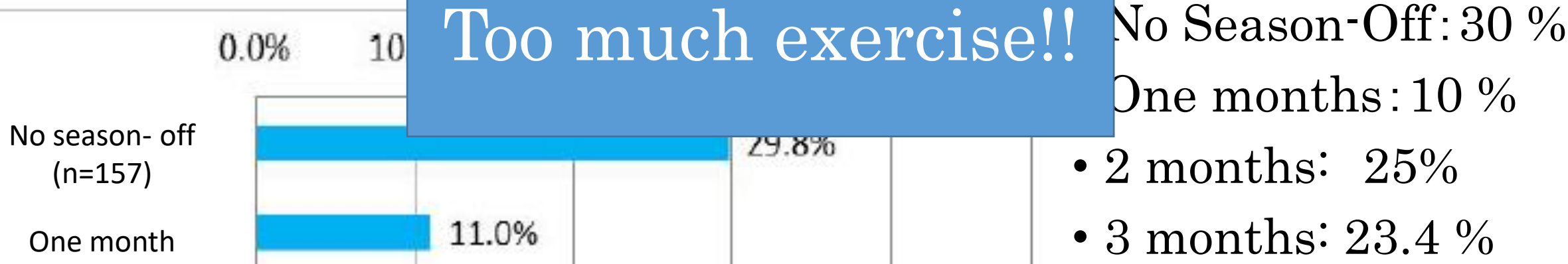
| variables | | pain (-) | pain(+) | P value |
|---------------------------------------|----------------------|---------------------|---------------------|---------|
| Years of experience | 0 | 994(86.5%) | 155(13.5%) | p<0.001 |
| | 1 | 1603(74.4%) | 551(25.6%) | |
| | 2 | 1482(62.7%) | 882(37.3%) | |
| | 3 | 1188(57.7%) | 870(42.3%) | |
| | 4 | 758(50.3%) | 748(49.7%) | |
| | 5 | 385(45.5%) | 461(54.5%) | |
| | 6-7 | 33(43.4%) | 43(56.6%) | |
| Days of practice/ W | Less than 5 days/W | 5859(63.9%) | 3309(36.1%) | |
| | More than 6 days /W | 408(59.3%) | 280(40.7%) | |
| Hrs of practice in the weekend | | 11.3 ± 4.6 (n=6452) | 11.8 ± 4.6 (n=3706) | p<0.001 |
| Pitch counts per week | Less than 100/W | 5799(65.2%) | 3100(34.8%) | p<0.001 |
| | More than 100/W | 368(44.9%) | 451(55.1%) | |
| Duration of Off-Season | More than 2 months | 3739(65.0%) | 2015(35.0%) | p<0.001 |
| | Less than one month | 2536(61.4%) | 1594(38.6%) | |
| Position experienced | Only position player | 4212(73.9%) | 1489(26.1%) | p<0.001 |
| | Pitcher | 1060(50.7%) | 1030(49.3%) | |
| | Pitcher and catcher | 660(43.6%) | 855(56.4%) | |
| | Catcher | 554(60.1%) | 368(39.9%) | |

Risk Factor of experience of shoulder and elbow pain (multivariate analysis)

| | Multivariate analysis | |
|--|-----------------------|---------|
| | Odds ratio (95%CI) | p value |
| Years of experience | 1.272 (1.230 - 1.317) | p<0.001 |
| Days of practice/W : > 6d /W vs <5 d /W | 1.260 (1.065 - 1.489) | p=0.007 |
| Hrs of practice in the weekend | 0.994 (0.984 - 1.004) | p=0.253 |
| Pitch counts/W : >100/W vs 100/W | 1.184 (1.007 - 1.391) | p=0.041 |
| Season-off: < one month vs >2 months | 1.021 (0.931 - 1.120) | p=0.657 |
| Position: Pitcher vs fielder | 2.093 (1.857 - 2.359) | p<0.001 |
| Pitcher and catcher vs fielder | 2.589 (2.258 - 2.967) | p<0.001 |
| Catcher vs fielder | 1.541 (1.314 - 1.807) | p=0.005 |

Off-Season in Questionnaire to Coaches

Too much exercise!!



- No Season-Off: 30 %
- One months: 10 %
- 2 months: 25%
- 3 months: 23.4 %

Pitchers should refrain from throwing for at least 2-3 months per year and avoid competitive pitching for at least 4 months per year. (ASMI, 2015)



「運動部の10年、世界運動
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大好きな野球を長く続けるために

成長期の野球障害

小学生、中学生のみなさんはからだが大きくなる時期です。この時期の骨には成長する軟骨(骨端線:成長軟骨、骨端核:骨端軟骨)があります。成長軟骨は、大人の骨とちがって弱いのです。弱い軟骨に負担がかかりすぎ(使いすぎ)ると痛みがでます。

〈肩の痛み〉



〈ひじの内側の痛み〉



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将来も野球を楽しみ、選手として活躍するためのセルフチェック



1 ひじが左右同じように伸ばせるか

同じように
伸びるか



educating players by distributing elbow self-check booklets every Monday for early detection of little league shoulder and osteochondritis dissecans of the elbow,

途中
↓
ほぼ終了



正常



初期

この時期に発見すれば
野球が続けられる



終末期

発見が遅い

ひどくなると肘の外側の軟骨がはがれて手術が必要となったり、動きがわるくなることがあります。肘の外側の痛みを放置すると野球ができなくなる可能性があります。肘が痛かったり、曲げ伸ばしがいつもと違う場合はすぐに整形外科へいきましよう。

★大人になっても野球を楽しみ、選手として活躍するために、傷害を自分で見つける方法をうらに示します。



2 お 押さえて痛いところがあるか

ひじの内側

ひじの外側

肩



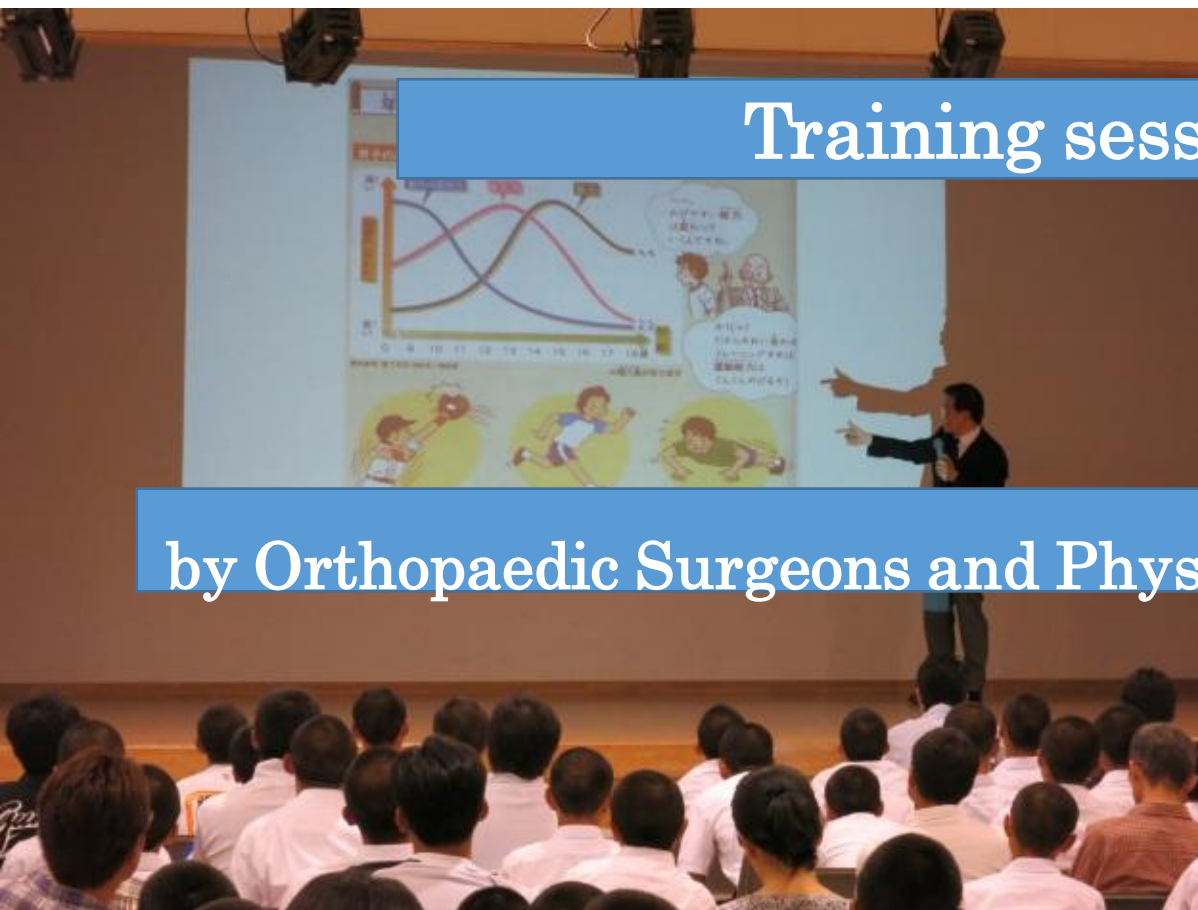
月曜日はセルフチェックの日です!

いじょうがあつたらすぐに大人に知らせましよう。
早くみつけ、早く治療すれば、また野球ができます。
ておくれになると手術になつたり、ふだんの生活がしにくくなることがあります。

To educate coaches and parents

Training sessions for them

by Orthopaedic Surgeons and Physical therapists in 9 cities every year.



Conclusion

- The number of full-power pitches for schoolchildren shall be 50 or less per day, and 200 or less per week including the games.
- Players should therefore take at least 2 days of rest per week.
- The coaches need to reduce the burden on pitchers and catchers and to train as many players as possible.
- Training sessions for coaches and parents by orthopaedic surgeons and physical therapists are needed to educate coaches and parents.

Thank you for your attention!!



- A team from South Korea took Second Place at LITTLE LEAGUE BASEBALL® WORLD SERIES WILLIAMSPORT, PA 2016