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# Development of Specialized Hand-held Electronic Dictionaries with Special Reference to Those for Medical Professionals and Students[1]

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ABSTRACT

*In the course of 25 years of their existence, hand-held electronic dictionaries (HHEDs) have become more comprehensive in terms of content and more sophisticated technologically. One dimension in which the specification of these devices has advanced is the subject field of HHEDs. Medicine is one prime example of this trend. Medical HHEDs, which include many specialized, not readily accessible print dictionaries, save the user considerable time and effort. The HHED's electronically enhanced navigability makes almost redundant the rules and conventions associated with consultation of print dictionaries. The market of medical HHEDs has been dominated by Casio and Seiko Instruments Inc. (SII). Each manufacturer contracted a block of publishers to supply contents for its respective set of products. With SII's withdrawal from the HHED business,* Stedman's Medical Dictionary *and its Japanese version were included in Casio's HHED. The integration of a source dictionary and its translated version to be exploited for bi-directional consultation and learning in either language can be a useful, potential avenue for the next generation of HHEDs, in the environment rendered more competitive by a wide array of smart devices with Internet connectivity.*

*Keywords: hand-held electronic dictionary, medical dictionary, organization, print dictionary, specialized dictionary*

## INTRODUCTION

Hand-held electronic dictionaries (HHEDs) are stand-alone devices that make possible a flexible and comprehensive use of included reference and other works with electronically enhanced search methods. These electronic products are popular predominantly in East Asia (Yamada 2009, Ding 2015, etc.); however, they are not well known to the rest of the world. Having a quarter century tradition behind them in Japan, HHEDs have become commonplace among senior high school and university students[2]. In the course of their development, electronic dictionaries diversified to cater to specific needs of users and subject fields. There are special HHEDs intended for medical professionals by Casio and SII (Seiko Instruments Inc.). This paper looks at those medical HHEDs in the development of the electronic devices in general, compare the use of *Stedman's Medical Dictionary* (*Stedman's MD*) and its Japanese version *Stedman's English-Japanese Medical Dictionary* (*Stedman's E-J MD*) in book and electronic forms (adapted for use in HHED). The paper also looks into the possibility of a source/translation dictionary pair as parallel texts to be manipulated for various purposes in the medium of HHED as a direction for future development.

## OVERVIEW OF HHEDS

### GENERAL CHARACTERISTICS

Yamada (2013, p. 158) mentions seven advantages that set HHEDs apart from other types of reference works: ease, speed, flexibility and exhaustiveness of reference; portability; versatility; and consultation self-sufficiency. Sekiyama also refers to several practical benefits:

> The ability to access detailed information by jumping across hundreds of dictionaries, the ability to use them immediately after powering on, long battery life and the lack of distraction due to the absence of internet connectivity are among the advantages of HUEDs[3]. (Sekiyama 2016a, p. 25)

Among the most recent and advanced HHED, Casio's XD-G2000 (2017), for example, is intended for professionals, such as researchers and translators. The dimensions are 148.0x105.5x18.5mm (when closed), weighing 265g. The retail price is about 43,500 JPY (395 USD). Special features include: 200 reference and other works, additional materials to be added by downloading and through SD cards, human voice audio recordings, 3,000 works of literature (2,000 Japanese and 1,000 English), 2,000 extracts of classical music pieces, touch panel, color liquid crystal display screen, sturdy frame, power by two AA size batteries[4].

## DEVELOPMENT OF HHEDS IN JAPAN

According to Sekiyama (2016b), the history of Japan's HHEDs began with TR-700 (1991) by SII (then Seiko Instruments & Electronics Ltd.)[5]. It was an epoch-making product, which included the following three dictionaries:

> *Kenkyusha's New Collegiate English-Japanese Dictionary*. 5th ed. 1985.
> *Kenkyusha's New Collegiate Japanese-English Dictionary*. 3rd ed. 1983.
> *Roget's II New Thesaurus*. 1988.

Sekiyama (*ibid*.) divides the ensuing quarter of a century of development of HHEDs into four stages, pointing out important innovations, functions, and facts.

> **First stage (1991-1999):**
> **-"Jump" function:** allowed the user to highlight a word in a dictionary text to go to the entry to check the word's meaning in another included dictionary
> **-Phrase search:** enabled the user to access a phrase entry from any content word involved in the phrase
> **Second stage (2000-2002):**
> **-Incremental search:** indicated candidate words as the searched word was being typed by the letter
> **-Example sentence search:** culled all example sentences including entered key words from a dictionary included in an HUED[6]
> -HUEDs outsold hand-held electronic vocabulary books in 2002 and onward.
> **Third stage (2003-2006):**
> -The frame became sturdy enough to endure the commutes to high school.
> **-Multiple-dictionary search:** allowed the user to consult appropriate types of included dictionaries simultaneously without designating any
> -Hopping between the included dictionaries became possible.
> -Competition intensified between HUEDs for the number of works to include. For example, Casio's XD-GT 6800 boasted 100 works.
> **Fourth stage (2007-present):**
> -Competition came from smart devices, such as smartphones and tablet computers.
> -The number of works included leveled off at 200. Instead, HUEDs incorporated radio and TV English language programs[7] to differentiate themselves from smart devices.

## DIVERSIFICATION TO CATER TO SPECIFIC USER NEEDS

Since an early stage, HHEDs have been devised with the needs of English-Japanese translators, business people, and learners of foreign languages in mind. After the mid-2000's, in an effort to reach more audiences, products have diversified. Specification has developed along three lines: the target users' ages and education levels (adults and college students down to elementary school students), subject categories (languages, law, medicine, etc.), and professions (translators, researchers, etc.) (Yamada 2014, p. 2).

Medical HHEDs are subject-specific products as will be detailed in the next section. There are also such electronic dictionaries in other subject fields. The first of those HHEDs are listed below with a few important specialized dictionaries included.

**Engineering:** SII's SR-G8000 (2007)[8] was intended for engineers, including the following dictionaries:

> *180-mango Taiyaku Dai-jiten Ei-wa Wa-ei* [1.8 Million-word Database of English-Japanese and Japanese-English Technical Terms]. 2003. Nichigai Associates.
> *Unno's Real English Dictionaries* [Business and Technical English-Japanese and Japanese-English Dictionaries]. 2002. Nichigai Associates.

**Law:** Casio's XD-ST9200HR (2006) targeted legal professionals and students, including:

> *Mohan Compendium of Japanese Law 2005*. Sanseido.
> *Dictionary to Learn Legal Terminology*. 2nd ed. 2003. Jiyukokuminsha.

**Nursing:** Manufactured by Casio and marketed by Igakushoin (publisher), IS-N1000 (2005) is the first of the regularly updated and expanded series of HHEDs meant for practicing and prospective nurses. The latest 11th edition IS-N11000 (2017)[9] incorporates 70 reference works and other resources, including:

> *Nursing Dictionary*. 2nd ed. 2010. Igakushoin.
> *Hokenshi Josanshi Kangoshi Kokka Shiken Shutsudai Kijun* [Collection of National Examinations for Nurses and Midwives]. 2013. Igakushoin.

Also included are 60 instructional videos. Purchasers are offered a three-year access right to Igakushoin's online versions of *Nursing Dictionary* and *Pocket Medical Dictionary* (2002).

**Physics, chemistry, and mathematics:** Casio's XD-U9850 (2014) is produced for students of physics, chemistry, and mathematics, incorporating:

> *Iwanami Rikagaku Jiten* [Dictionary of Physics and Chemistry]. 5th ed., 1998.
> *Koko Sugaku Kaiho Jiten* [Dictionary of Solutions to Senior High School Mathematics Problems]. Revised ed. 2003. Obunsha.

## RECENT INNOVATIONS

The HHED as a stand-alone device possesses several advantages. As mentioned in GENERAL CHARACTERISTCS, one of them is consultation self-sufficiency, which allows the user to check an unknown word when reading a foreign language newspaper on the train, for example. However, this supposed strength can also have adverse effects, for instance, in writing on the computer. One has to go back and forth between the computer and the HHED: typing in a search word into the hand-held device and typing again the elicited information (words or phrases) onto the computer screen. To avoid this inconvenience, SII developed the "Pasorama" technology. It enables the user to manipulate the dictionary data in an HHED from the computer keyboard, with the HHED connected to the computer with a USB cable. It is possible to cut and paste into and out of the HHED with the mouse, bypassing the keyboard completely (Yamada 2014, p. 5).

Independence from the Internet has won the HHED trust among users. Information from the included works is limited but reliable, while information on the Internet is vast but of uneven quality. In an effort to combine both advantages, SII equipped their "Dayfiler" line

of products with Internet access via Wi-Fi.

There has been emphasis shift from reference to learning. As Sekiyama (2016b) points out, HHEDs are more concerned with helping the user's learning than with expanding the list of works included, to compete against smart devices with an Internet connection. This is reflected in kinds of works included and in functions. As far as English is concerned, recent HHEDs incorporate the following kinds of books and materials, in addition to preparatory materials for the TOEFL® and TOEIC® tests and listening textbooks: radio and TV English language programs (see Note 7), and pronunciation evaluation devices[10]. In 2016, Casio introduced "English Training Gym" for users to manage their study of English, making use of the materials included in an HHED. A medical HHED, XD-Y5900MED, is equipped with this function. On the default screen of English Training Gym, there appear four banners, entitled vocabulary, listening, speaking, and test preparation. All relevant included resources are categorized under these headings. A touch upon a banner shows the list of selected materials on the screen. The user chooses one material and start work on it. The English Training Gym keeps record of and shows the progress both numerically (in fractions) and visually (in graphs) to help the user to study effectively, while maintaining motivation[11].

## MEDICAL HHEDS

It was also in the mid-2000's that HHEDs for medical professionals and students were launched by SII and Casio. This section looks at the first and the most recent products by these manufacturers, comparing the included medical reference works. I will highlight *Stedman's MD* and its Japanese translation *Stedman's E-J MD*, both of which are included in Casio's XD-Y5900MED. A comparative study will be made of this pair of medical dictionaries in print and electronic forms to explore the implications of the digitalization by means of HHED on dictionary organization, description, and consultation.

### PIONEERING DAYS

The first medical HHED is SII's SR-T6800 (2004; 65,000JPY, 590.9USD). The following nine dictionaries were included:

*Stedman's E-J MD*. 5th ed. 2002. Medical View (105,000 refs., 700 illus.).
*Kenkyusha's English-Japanese Dictionary for the General Reader*. 2nd ed. 1999 (270,000 refs.).
*Kenkyusha's New College Japanese-English Dictionary*. 4th ed. 1995.
*Concise Oxford Dictionary*. 10th ed. 1999.
*Concise Oxford Thesaurus*. 2nd ed. 2002.
*Kojien* [Japanese dictionary]. 5th ed. 1998. Iwanami.
*Gyakubiki Kojien* [reverse *Kojien* dictionary]. 1999. Iwanami.
*Kanjigen* [Chinese character dictionary]. 1994. Gakken.
*Personal Katakana Words Dictionary*. 1999. Gakken.

A comprehensive medical dictionary *Stedman's E-J MD* was incorporated for the first time. Only the textual content was included in the electronic dictionary, and the over 700 illustrations and diagrams were provided in the accompanying booklet[12]. The Japanese-English index was integrated, which made it possible to access the information arranged under English headwords also by keying in Japanese terms.

In the same year, Casio launched XD-V5200MED. The product incorporated the following nine dictionaries. Apart from a few overlaps, distinct dictionaries were included from SII's HHED:

*Nanzando Medical Dictionary*. 18th ed. 1998.
*Medical English-Japanese Dictionary*. 11th ed. 1997. Nanzando.
*Dictionary of Practical Abbreviations in Medicine*. 4th ed. 2001. Nanzando.
*Kojien* [Japanese dictionary]. 5th ed. 1998. Iwanami. [also in SR-T6800]
*Gyakubiki Kojien* [reverse *Kojien* dictionary]. 1999. Iwanami. [also in SR-T6800]
*Kanjigen* [Chinese character dictionary]. 1994. Gakken. [also in SR-T6800]
*Genius English-Japanese Dictionary*. 3rd ed. 2001. Taishukan.
*Genius Japanese-English Dictionary*. 1st ed. 1997. Taishukan.
*Eigo Ruigo Jiten* [English thesaurus]. 1998. Taishukan[13].

From the comparison of the included works, it is obvious that there are tie-ups between manufacturers and publishers. Nanzando and Nankodo are in the Casio bloc, and Medical View and Igakushoin are in that of SII.

At the end of this section, to assess the benefits and convenience brought to medical students by the HHEDs, let us consider the situation before the appearance of SR-T6800 and XD-V5200MED. In those days, in reading medical papers, students had a choice of the following types of dictionaries in different media to consult, but had to use them individually in prioritized combinations:

Large medical English-Japanese dictionaries in book form or on CD-ROM (e.g., *Stedman's E-J MD*)
Large general English-Japanese dictionaries in book form, on CD-ROM, or in HHED (e.g., *Kenkyusha's English-Japanese Dictionary for the General Reader*)
Databases in book form or on CD-ROM (e.g., *180-mango Taiyaku Dai-jiten Ei-wa Wa-ei* [1.8 Million-word Database of English-Japanese and Japanese-English Technical Terms])

SR-T6800, including the first two of the above-mentioned dictionaries, is supposed to have saved the student a considerable amount of time and effort. The user was freed from (a trip to the library and) the trouble of locating and then flipping throughout a bulky dictionary or a long wait from starting dictionary software. The incremental search lessened the trouble of recalling and typing a search word in full. Also, even though the multiple-dictionary search was not introduced yet, the need to retype a search word for an additional search with a different dictionary was eliminated, with a press of a dictionary selection key, the jump function, and the backtracking function (record of past consultations).

The market for medical HHEDs had been dominated by Casio and SII until 2015 when the latter withdrew from the HHED business altogether[14]. Each manufacturer produced one or two medical HHEDs per year. Since 2007 Casio has rolled out a series of high-end products, making them more sophisticated yet affordable each year[15].

## STATE OF THE ART

Let us look at the state of the art of medical HHEDs by comparing the most recent and advanced products from Casio and SII: XD-Y5900MED and DF-X11001, respectively. Table 1 summarizes the launch years, retail prices, and the numbers of works included.

TABLE 1. XD-Y5900MED and DF-X11001

| Manufacturer | Casio | SII |
|---|---|---|
| Product no. | XD-Y5900MED | DF-X11001 |
| Launch year | 2016 | 2015 |
| Price | 97,200 JPY (883.6USD) | 76,000 JPY (690.9 USD) |
| No. of works included | 110 works | 27 works |

Generally, Casio and SII pursue different approaches in terms of the number of works included. As far as medical resources are concerned, XD-Y5900MED includes eight works

and DF-X11001 seven. One of them is common, four are similar, and the others are different (see Table 2 below)[16]. *Stedman's E-J MD* is included in both HHEDs. The Japanese-translated medical dictionary had been in SII's line of medical HHEDs since the first product. The dictionary and the source dictionary *Stedman's MD* went into Casio's HHED for the first time in 2016, when SII's exclusive contract with Lippincott Williams & Wilkins ended with the manufacturer's withdrawal from the HHED business[17]. Though with different titles, Casio's and SII's HHEDs include one resource from each of these categories: Japanese medical dictionaries, reference works for abbreviations, therapeutic agents, and medical English conversation. In addition, Casio's product uniquely includes another English-Japanese medical dictionary and a work on clinical examinations, and SII's a dictionary of medical English usage and a medical English listening material.

TABLE 2. Resources on Medicine Included in HHEDs

| | | Casio's **XD-Y5900MED** | SII's **DF-X11001** |
|---|---|---|---|
| Common | | **Stedman's English-Japanese Medical Dictionary.** 6th ed. 2008. Medical View. (100,000 refs., 550 illus.) | |
| Similar | Japanese Med. | **Nanzando Medical Dictionary.** 20th ed. 2015. (40,000 refs., 750 illus.) | **Igakushoin's Medical Dictionary.** 2nd ed. 2009. (52,000 refs., 2,400 illus.) |
| | Abbreviation | **Dictionary of Practical Abbreviations in Medicine.** 6th ed. 2011. Nanzando. (9,200 refs.) | **Stedman's Abbreviations, Acronyms & Symbols.** 2001. Medical View. (45,000 refs.) |
| | Therapeutics | **Today's Therapeutic Agents.** 2015. Nankodo. | **Manual of Therapeutic Agents.** 2013. Igakushoin. |
| | Med. English Conversation | **Medical English Conversation.** 2006. Taishukan. (400 examples) | **Illustrated Multilingual Hospital Conversation.** Joho Center. |
| Different | | **Stedman's Medical Dictionary.** 28th ed. 2006. (107,000 refs., 1,000 illus.)<br>**Medical English-Japanese Dictionary.** 12th ed. 2005. Nanzando. (250,000 refs.)<br>**Today's Clinical Examinations 2015-2016.** Nankodo. (780 refs., 300 illus.) | **Fundamental Usages for Medical English.** 1990. Medical View. (1,681 headwords)<br>**3,000 Medical English Words: Listening.** 2000. Medical View. |

## COMPARISON OF MEDICAL DICTIONARIES IN PRINT FORM AND HHED

This section closely examines *Stedman's MD* and its Japanese-translated edition *Stedman's E-J MD*, comparing the print versions and the electronic ones, included in Casio's XD-Y5900MED[18]. First, let us look briefly at the history and characteristics of *Stedman's MD* and its Japanese translation.

### OVERVIEW OF *STEDMAN'S MD* AND *STEDMAN'S E-J MD*

***Stedman's Medical Dictionary.*** 28th ed. 2006. Baltimore: Lippincott Williams & Wilkins. (l+2,169+APP176 pp., 107,000 refs., 1,000 illus.; 6,154JPY [55.9USD])

Now in its 28th edition, *Stedman's MD* is considered one of the most comprehensive reference works for those involved in healthcare. The origin of the dictionary can be traced back to "the first American medical dictionary," *A New Dictionary of Medical Science and Literature* (1st ed. 1833) by Robley Dunglinson (Stegman & Branger 2006). The dictionary was published to the 23rd and final edition (1903), which was edited by Thomas Lathrop Stedman (1853-1938), who was "a prominent New York physician and distinguished medical editor and author" (Hensyl 1980). In 1908, Stedman started preparation for *A Practical Medical Dictionary* (1911) with the intention "to challenge the two preeminent medical dictionaries of the time which he believed persisted in not correctly spelling terms in accordance with their derivations and therefore debased the medical language" (*ibid.*). He engaged in work on his dictionary into the 14th edition, which was published in 1939 posthumously under his name as "Stedman's Medical Dictionary."

The latest 28th edition (2006) deals with over 107,000 terms, with 5,000 new entries. The editorial board of medical and scientific consultants, the concept of which was introduced in the process of preparing the 20th ed. (1961) in response to expanding medical science (*ibid.*), consisted of 48 consultants covering 47 medical specialties. Illustrations have been updated and increased to 1,000 from 900 in the previous edition (2000). They are interspersed in the dictionary body and are included in the middle matter[19].

As a unique feature of an English medical dictionary of this size, usage notes are included which are extensive and systematic to draw users' attention to common errors in medical usage: sense, spelling, pronunciation, and style (see **abscess** in Appendix A). Utility of these notes for ESL users of the dictionary is mentioned in the preface.

***Stedman's English-Japanese Medical Dictionary.*** 6th ed. 2008. Tokyo: Medical View. (48+2,063+Middle matter A26+Appendices 105+Japanese-English index 432 pp.; 100,000 refs., 550 illus.; 17,280 JPY [157.1USD])

*Stedman's E-J MD* was published in 1980 as the Japanese-translated version of *Stedman's MD* (23rd ed., 1976). Revision of the Japanese version has been conducted almost every five years since, the latest 6th edition being based on the 28th edition of the original dictionary. Seventy-three leading experts were involved in the last revision of the Japanese version. Although it reflects the changes introduced to the original dictionary, the Japanese edition is not a mere translation of the source dictionary. There are special features and considerations introduced with Japanese users in mind. The most noteworthy is the Japanese-English index in the back matter. The 432-page index with 9,000 terms provides an added access route, enabling users to consult the wealth of information organized by English headwords, staring from Japanese as well. Other special features include the indication of pronunciation of foreign names in the Japanese *katakana* syllabary, and additional glosses and explanations with consideration to the Japanese situations.

## ORGANIZATION OF PRINT DICTIONARIES

To deal with the extensive vocabulary of medical and related sciences, consisting largely of multiple-word terms (cf. Landau 2001, p. 108), in the form of dictionary, *Stedman's MD* employs niching – subentries are arranged alphabetically under main entries. Cross-references abound, for, where there is more than one synonymous term, the definition is only provided for one of them, to concentrate information and to keep the dictionary within manageable size (pp. xliii-xliv). As far as print dictionaries are concerned, building an efficient system with organization compatible with accessibility requires the dictionary to adopt a numbers of rules, conventions, and ingenuities at various levels and the user to be familiar with them (including exceptions) to navigate through the dictionary in search of information. This sub-section looks at how meticulously information is organized in the two print dictionaries[20] and how access is enhanced in the HHED.

### ENTRY DEMARCATION

The divisions of entries provide users with important information in consulting a print dictionary. This is even more relevant for the users of *Stedman's MD*. Because of the characteristic structure of a special-field terminology and the organizational principle of such a dictionary, there are lengthy main entries (sometimes extending over multiple pages) with a very long list of subentries from which to choose an appropriate one. As changes introduced in the 28th ed. for ease of reference, the boundaries of such main entries are clearly indicated: the beginning is marked by a headword in white capitals against the background of a column-wide green banner, and the ending by a thick green line (see Appendix A). Entries of "high-profile" words are provided in light-blue boxes[21].

ALPHABETIZATION

Solid and hyphenated compounds are entered as main headwords, and spaced compounds are as subentries. Location of the latter can be confusing. For example, all the following compound terms are entered under **tumor**: **carcinoid tumor**, **giant call tumor of bone**, and **Wilms tumor** (p. xli). As a rule, multiple-word chemical and drug terms are entered at the first element. However, if a term includes a general word indicating 'kind' or 'type,' the term is located at the word (*ibid*.): e.g., **acute abscess** and **abscess cavity** are found under **abscess** and **cavity**, respectively. To save space, **acute abscess** is listed as **acute a.**, with the headword item "agent" abbreviated to "a."[22] (see Appendix A).

In alphabetization of main entries, the following are ignored: prepositions, conjunctions, articles, apostrophes of possessives, spaces, punctuations, Greek letters (e.g., α, β, γ), numbers, configurational characters (e.g., D-, +, -), and italicized forms (e.g., *p*-, *N*-, *cis*-) (p. xlii). However, prepositional phrases (especially Latin: e.g., *in vitro*) are found at their alphabetical places. The same applies to spelled-out Greek letters and configurational forms: e.g., **α-naphthylthiourea** is listed after **naphthyl**. Listing of subentries follows the same principles as those of main entries, except that the main entry item is ignored in alphabetization.

MICROSTRUCTURE

A main entry is structured as follows. The headword is provided in bold[23]. The pronunciation appears in parentheses. Definition follows. Multiple definitions are numbered, but "their numerical sequence does not necessarily indicate importance or preference" (p. xliv). Etymology in square brackets comes before the list of subentries[24].

CROSS-REFERENCES

There are numerous cross-references (typed in light blue) in *Stedman's MD*. Due to space constraints and to optimize information presentation, some entries are provided with only synonyms that cross-refer the user to the defined entry. To save space, the same rules of abbreviation as subentries (Note 22) are applied to cross-references. When the cross-reference points to another subentry within the same main entry, the headword item is represented by the initial letter:

> **apical a.** SYN periapical a.

When the cross-reference is made to an item outside the same main entry, the headword item under which the term is located is italicized:

> **Munro a.** … SYN Munro *macroabscess*.

In addition to "SYN," there are other cross-referencing indicators: SEE, SEE ALSO, and Cf. (in the decreasing order of direct relationship, xlv)[25].

SPECIAL GUIDANCE ON LOCATION OF MULTIPLE-WORD TERMS

In *Stedman's MD*, consultation of multiple-word terms can be a complicated and time-consuming process. For successful consultation, users need to familiarize themselves with the above-mentioned specifics of dictionary structure and conventions and strictly follow the rules they entail. In addition, the dictionary offers the following general advice:

**Tips on Finding Multiple-Word Terms**

- Look at the alphabetical location of the specific words comprising the term.
- Look under another main entry that is similar to the term you are looking for.
- Look at cross-references.

| **To find** | **Look under** |
|---|---|
| a surgical procedure | operation |
| | technique |
| | method |
| a disease | syndrome |

(p. xli)

USE OF ELECTRONIC VERSIONS

ACCESS TO MEDICAL RESOURCES

In Casio's XD-Y5900MED, there are two ways to access the works on medicine: the dictionary selection buttons (except for *Medical English Conversation*) or the menu. There are seven dictionary selection buttons above the keyboard. Four of them are dedicated to medical resources. Each button is assigned two works. The medical resources are paired as follows (from left to right): *Nanzando MD* and *E-J D for the General Reader* (this is not a medical dictionary, though), *Stedman's MD* and *Stedman's E-J MD*, *Medical E-J D* and *Dictionary of Practical Abbreviations in Medicine*, and *Today's Therapeutic Agents* and *Today's Clinical Examinations*. One press of a button shows the first of the pair and another shows the second. As the other option, a press of the menu button shows categories. A touch upon "medicine" brings the icons (cover photos) of all eight medical resources onto the screen. To use the reference work, simply touch an icon.

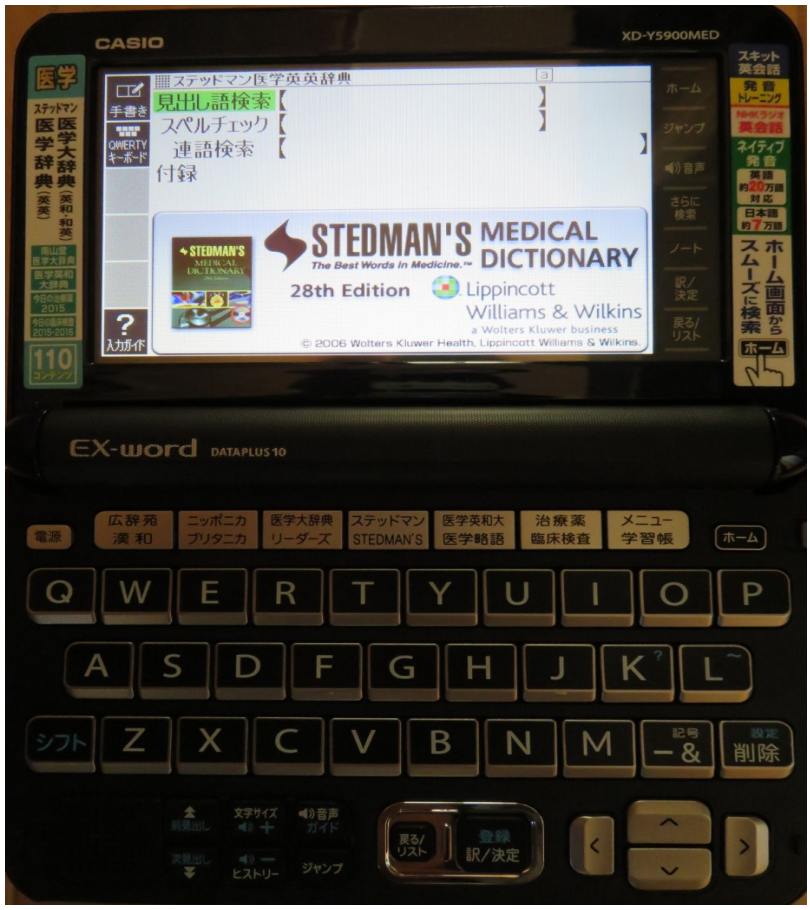


FIGURE 1. XD-Y5900MED with *Stedman's MD* Shown

ACCESS STRUCTURE

*Stedman's MD* allows the following four references from the default screen: 1) headword search, 2) spell checker, 3) compound search, and 4) appendix search. The organization of information is discussed, dealing mainly with the first.

1) **Headword search:** To the entered spelling, 10 headwords and multi-word subheads are shown in alphabetical order with the exact or nearest match at the top in the left-hand column. With a compound term, the element making a main entry is indicated in square brackets. On the right-hand side, the preview of the entry of the first item in the left-hand list is shown. By highlighting an item in the list, the user can show the preview of the entry. They press the "translate/execute" button below the keyboards to go to the entry.

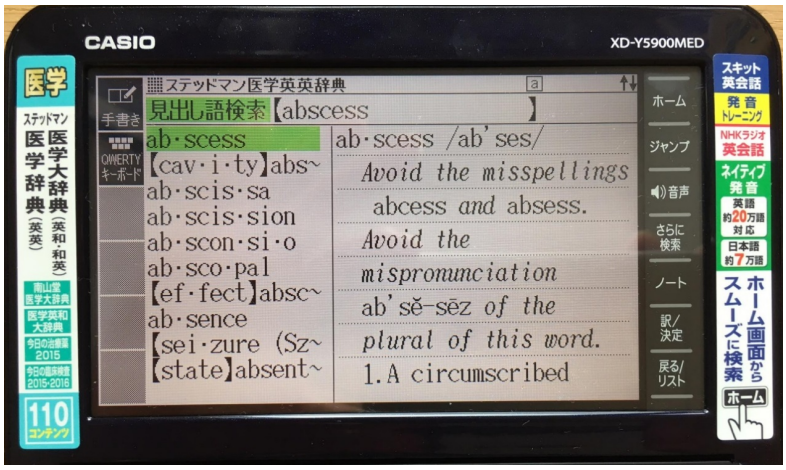


FIGURE 2. Headword Search in *Stedman's MD* in XD-Y5900MED

MAIN ENTRY

A main entry (e.g., **abscess** in Appendix A) is shown in the same way as in the print version, except that subentries are listed without definitions or synonyms. Each subentry term is given in red type, preceded by an arrow, without the headword item being abbreviated to the initial letter. To show the entry, the user touches the term, or presses the "jump" function key to highlight a subhead then the "translate/execute" key.

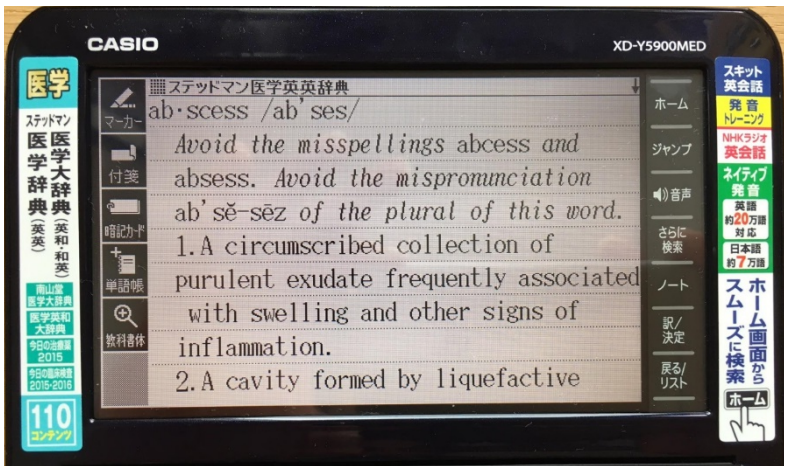


FIGURE 3. **abscess** in *Stedman's MD* in XD-Y5900MED

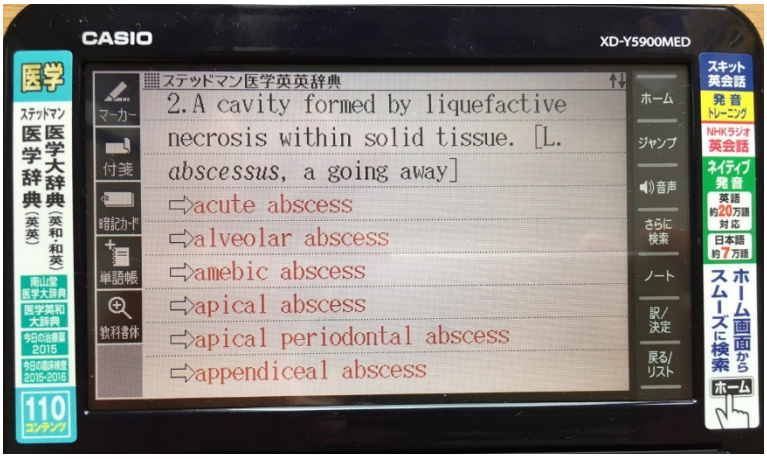


FIGURE 4. **abscess** (cont.) in *Stedman's MD* in XD-Y5900MED

SUBENTRY

A subentry is shown in the same manner as in the print edition. The exception is that synonyms or cross-references are not abbreviated or typographically discriminated according to the location of the entry within or outside the main entry being consulted (see **Munro abscess** in Fig. 5, cf. CROSS-REFERENCES)[26].

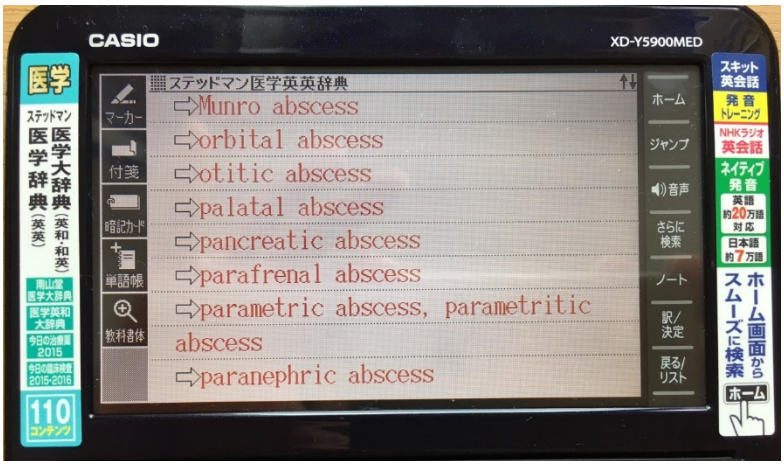


FIGURE 5. Subentries under **abscess** in *Stedman's MD* in XD-Y5900MED

Without special conventions or typological discrimination, there is no knowing that **periapical abscess** is given as a synonym to **apical abscess**, both being listed under the main entry **abscess** and that **Munro macroabscess** is given as a synonym to **Munro abscess**, the former being entered under **macroabscess** but the latter under **abscess**. Importantly, however, this type of knowledge does not constitute a prerequisite for consultation of an electronic dictionary, nor are the rules of alphabetization (ALPHABETIZATION) or *Stedman's MD*'s "Tips on Finding Multiple-Word Terms" (p. xli).

The transfer from a cross-reference to the suggested entry is much easier in *Stedman's E-J MD* than in its original English edition. With *Stedman's E-J MD*, all that one has to do is to touch the cross-referencing synonym, or press the "jump" button to highlight the synonym and push the "translate/execute" button. In contrast, the user has to go through a rather complex process to show the cross-referred entry in *Stedman's MD*. For example, to go from **apical abscess** to **periapical abscess** (given as a synonym), the user has to follow the following steps:

1 Press the "jump" button to highlight the synonym. However, the highlight can only be made to one word; the whole compound cannot be covered. Therefore, try highlighting *periapical*[27].
2 The list of relevant dictionaries (whose headwords are in English or include the language) is shown with *periapical* or approximate headwords. Scroll the dictionary list by pressing the rightward scroll button. *Stedman's MD* appears as the seventh dictionary with [abscess] **periapical abscess** and **periapical** as candidate entries[28].

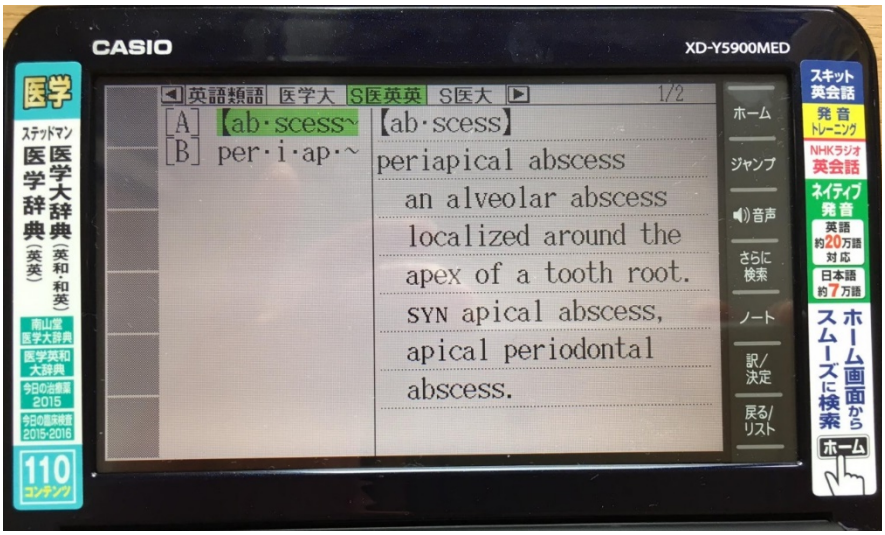


FIGURE 6. Result of the jump search from *periapical* in XD-Y5900MED

3 [abscess] **periapical abscess** is already highlighted and the preview of the entry is shown. Press the "translate/execute" button to show the entry in full.

As this example shows, *Stedman's E-J MD* is easier to navigate than the original dictionary. This is probably because *Stedman's E-J MD* has been improved for better adaption in the HHED since its first inclusion in 2004. On the other hand, *Stedman's MD* was incorporated in an HHED in 2016 for the first time. There is room for improvement in terms of navigability. The touch-to-show-entry function is available for subentries listed under main entries in *Stedman's MD*. This function should simply be extended to synonyms and cross-references, to save the user this multi-step procedure to reach cross-referred entries.

**2) Spell checker:** to the entered incorrect spelling, candidates are shown.

**3) Compound search:** main and sub-entries of compounds including the entered keyword are listed alphabetically with the keyword in the middle.

**4) Appendix search:** This function gives the user access to the plates included in the middle matter of the print dictionary. The search begins by choosing one out of the 64 headings from – "Human anatomy" to "Gerontology" – listed on the left-hand side of the screen. Then choose a subhead and press a sign to show the illustration. Too large to fit in the screen, pictures are scrollable. It is handy to be able to check the dictionary definition of the caption indicating a part of the picture in the pop-up window by touching on the caption[29]. The window can be expanded to full screen by the press of a button coming up on the left-hand side.


FIGURE 7. **Anterior view of the skull** under **Human anatomy** in XD-Y5900MED

*STEDMAN'S E-J MD*

*Stedman's E-J MD* allows the following searches from the default screen: 1) headword search, 2) spell checker, 3) compound search, and 4) Japanese search. While the last one based on the Japanese-English index is a unique search method, the first three are almost the same as those in *Stedman's MD*. The only differences are that in the headword search, a list of 15 items (rather than 10) is shown and that headwords and multi-word subheads are shown in alphabetical order, indiscriminately.

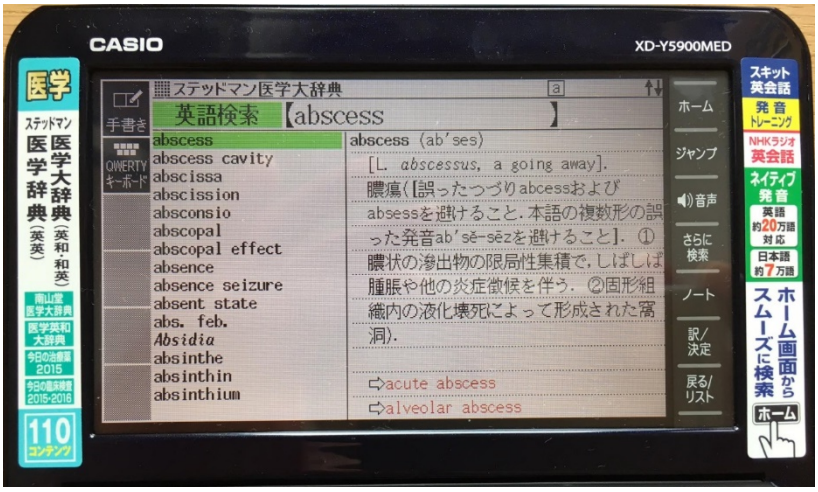


FIGURE 8. Headword Search in *Stedman's E-J MD* in XD-Y5900MED

**Japanese search:** to the entered Japanese, 15 Japanese terms from the 9,000-term Japanese-English index are shown in the Japanese alphabetical order, with the exact or nearest match at the top.

## POINTERS TO THE FUTURE DEVELOPMENTS

Now that *Stedman's MD* and its Japanese edition are packaged together in an HHED, the transfer between the two should be made much easier. Since the two dictionaries are assigned to the same dictionary selection button (ACCESS TO MEDICAL RESOURCES), one press of the button should enable a switch from one to the other. However, this is only possible

from the screen with the search box displayed. For example, to switch to *Stedman's E-J MD* from consultation of *Stedman's MD* (the screen showing an entry from the dictionary), the user has to press the back button once or twice to get the search box back on, and then to push the dictionary selection button. This is awkward. In addition, the transfer between the two dictionaries should be improved while using the spell checker and the compound search. Presently, the user has to start each search from scratch by keying in a search term.

It is very convenient that the Japanese-English index of *Stedman's E-J MD* is integrated in the electronic version and is usable from the default screen of the medical dictionary. This is an electronically enhanced search method, but there is more that could be done to this sort of index. In the print version, the index is 432 pages long with 9,000 Japanese terms. In the electronic version, the index based on careful selection can be expanded to include many more terms to improve consultation efficiency. Furthermore, the index can even be eliminated, if the full text of *Stedman's E-J MD* is electronically adapted so as to be searchable by any Japanese word or word combination. This is technically possible.

Further to the suggestions made in the preceding paragraphs, another practical innovation would be amalgamating *Stedman's MD* and *Stedman's E-J MD* in the medium of HHED. To the best of my knowledge, XD-Y5900MED is the first HHED to include both a source dictionary and its translated version. However, these two dictionaries are incorporated as independent works. If the two dictionaries are merged, so as to be manipulated for various linguistic analyses and for learning purposes, it would add much value to and open up new dimensions in the use of an HHED.

Aside from possible contractual complexities involving publishers and the manufacturer[30], we would like to see *Stedman's MD* and *Stedman's E-J MD* as parallel texts electronically combined for analyses and display to maximize the potential of the combined use of the source dictionary/translated dictionary pair for both Japanese and English-speaking users from either language.

If the two dictionaries are merged, the concept of transfer between them disappears. The HHED can be devised to automatically show the search results of both dictionaries in response to the consultation of either. The results can be shown in the split screen with *Stedman's MD* in the upper half and with *Stedman's E-J MD* in the bottom, or the other way round, according to the user's choice. Or, English and Japanese components are juxtaposed in each entry, so that the user can easily compare the definitions in both languages.

Here is another way of making full use of the wealth of information offered by the original and translated dictionaries. If the whole text of either dictionary can be searched on the basis of words and word combinations in English and Japanese, it will increase the potential of exhaustive search. In particular, a search for collocations will prove to be effective. If the two dictionary texts are subjected to collocation search in English and/or Japanese[31], it can extract important collocations specific to medical English and Japanese – and with their translations in the other language. It will be handy to be able to check the meaning of a collocation against the translation of the collocation in the other language. The collocation search will provide invaluable information for Japanese and English-speaking students of medicine, linguists, and lexicographers[32].

## CONCLUSION

Several factors are involved in determining the true value of a specialized HHED. The intrinsic characteristics of the HHED should be weighed against the nature of the subject field, specific user needs, and practical uses to which the device is put. The medical HHED

bundled with the subject field and other reference works brings a number of benefits and saves the user a considerable time and trouble of having to consult multiple dictionaries in different media one at a time The user is also freed from the requirement to (remember and) follow the organizational conventions and rules associated with the use of print dictionaries. In terms of up-to-datedness of information, however, the HHED is greatly disadvantaged because the product includes published print dictionaries. It may not be cost-effective to purchase a prohibitively expensive medical HHED every year for updated information. On the other hand, it puts Internet-based reference works at a great advantage to keep up with the expanding terminologies of medicine and related sciences, making modifications as needed. It is understandable that students are opting for up-to-the-minute information on the Internet through mobile devices[33].

It would be an interesting new development if the manufacturer could design and develop original, HHED-compatible resources from scratch, as Tono (2009: 65) suggests. However, it is unlikely given the present market trends. More realistic is for the manufacturer(s) to improve what they already have available and to fully capitalize on the strengths of the HHED: to make use of existing materials for better exploitation. Electronic media has opened up new and unanticipated avenues of dictionary use. Included in the HHED, the boundaries between dictionaries have been blurred. There are functions that consult several relevant dictionaries simultaneously. A new breakthrough in the development of HHEDs may lie in adapting and integrating a dictionary and its translated version organically for the use in a HHED as if the two works were one single bilingual, bi-directional resource to be manipulated flexibly for reference and learning. This is in line with making the most of the inherent strengths of the HHED, which is in search of a competitive edge over smart devices with an Internet connection. What holds for English/Japanese medical dictionaries is also applicable to other-genre dictionaries and to other language pairs, triplets, and even more.

## END NOTES

[1] I would like to express my gratitude to Professor Leonid Yoffe and Mr. Satoru Kikuchi for their help with the final draft of this paper. I would also like to thank Brain Corporation for the lease of a medical hand-held electronic dictionary, XD-Y5900MED.

[2] According to Oshima (2016), 58.3% and 76.2% of Japanese senior high school and university students, respectively, own an HHED.

[3] In Sekiyama (2016a and b), "HUED" stands for "hand-held unabridged electronic dictionary," which is a hand-held device that incorporates the cover-to-cover textual information carried by a print dictionary. In this paper, "HHED" is used.

[4] http://casio.jp/exword/products/XD-G20000/ accessed April 30, 2017

[5] Tono (2009, p. 34) deals with other hand-held devices than those including the full textual content of works. He traces the origin of the pocket electronic dictionary down to Sharp's IQ-3000 (2009).

[6] Sekiyama (2010) summarizes the development of the example sentence search function as follows:

> SII's *SR8000* (1999): First example search, runs a search for the examples in the relevant included dictionaries on the basis of the entered keywords
> SII's *SR-E10000* (2005): *Wordbank* (5 million words from *Bank of English*), example search with word order designated
> SII's *SR-G10000* (2006): searches examples in English-Japanese dictionaries on the basis of Japanese words (not of English words), results displayed with the key word in the middle
> SII's *SR-G10001* (2009): attribute-specific search with *Oxford Sentence Dictionary* (*OSD*, one million examples), can specify: mode (spoken, written edited/unedited), dialects (American, British, Canadian, etc.), and domains (fiction, law, medicine, news, etc.) (Sekiyama [2010] as quoted in Yamada [2013, p. 161])

*OSD* exists only in an electronic format. It is a collection of one million examples from *Oxford English Corpus* (two billion words). The examples were collected after 2000 to provide examples

for the unillustrated entries in *Oxford Dictionary of English* (*ODE*) (Sekiyama 2010). In Casio's recent HHEDs, the examples from *OSD* have been integrated into the appropriate senses of *ODE*.

[7] NHK's (Japan Broadcasting Corporation) programs are included: as a radio program, the previous year's edition of *Radio English Conversation*, for example; as TV programs, animated movie series *Little Charo* (a puppy's adventures) in 50 instalments each.

[8] The same manufacturer's SR-E9000 (2005) was intended for broader professional audiences: not only engineers but also business people and translation specialists. A large terminological database, *180-mango Taiyaku Dai-jiten Ei-wa Wa-ei* was incorporated for the first time in an HHED. Incidentally, there are other large databases that made their way into HHEDs than *Wordbank*, *OSD*, and "1.8 Million-word Database of English-Japanese and Japanese-English Technical Terms" (Yamada 2013, pp. 159-160):

> *One Million-word Comprehensive Database of Technical Terminology*. CJK Dictionary Institute. ("A comprehensive Japanese-English bilingual, bidirectional database of over 1,000,000 technical terms covering a broad spectrum of fields ranging from computer science to biotechnology," in Casio's *XD-SP9500* [2008], http://www.cjk.org/cjk/samples/japterm.htm)
> *Eijiro*. 2010. 5th ed. Alc. (1.7 million-word bilingual English-Japanese database, in Canon's *V330* [2010])

[9] There is a free 19-page HHED user guide.

[10] Since 2014, some of Casio's HHEDs have been equipped with a recording function. Those with *Hatsuon Toreningu* [Pronunciation Training] allow the user to say designated English words into the built-in microphone. The pronunciation is recorded and analyzed for the initial vowel or consonant of a word, and is evaluated in numerical terms (out of 100) with feedback.

[11] As a new development, the 2017 version of English Training Gym offers "Tra[ining] Gym Plan," which appears at the top of the default screen. The Plan suggests study menus for various purposes and different proficiency levels (e.g., Review of senior high English [listening]) with relevant materials, indicating the required time. The Plan is supervised by Professor Osamu Takeuchi, expert in English language educational technology.


*http://exword.jp/native/, accessed April 30, 2017*

FIGURE 9. English Training Gym

[12] Due to memory limitations, HHEDs in those days only stored the textual information of dictionaries.

[13] This work is only available in electronic form.

[14] In the medical HHEDs market, SII was once dominant but eventually lost out to Casio. Overall, sales of HHEDs peaked in 2004 (unit sales) and in 2007 (revenue) (Nakamura 2009: 23). In the shrinking market, all the other manufacturers lost market share to the sole leader Casio. Here is a comparison of market share of 2007 and 2016:

TABLE 3. Market Share of HHEDs

| Manufacturer | 2007 (BNC Ranking) | Oct., 2016 (Kakaku.com) |
|---|---|---|
| Casio | 50.7% | 82.36% |
| Sharp | 31.5 | 16.15 |
| Canon | 9.4 | 0.69 |
| SII | 8.2 | 0.36 |
| Others | 0.3 | (King Jim 0.28) |

Sony pulled out in 2006, and so did SII in 2015. Oshima (2016) showed that Casio prevailed and persisted, nevertheless, suffering only slight declines in unit sales in recent years. He attributes his company's strength to a strategic focus on the products for senior high school students, a segment which generates stable annual sales. On the other hand, SII's strategies to cater to specialist needs did not prove to be successful, at least in commercial terms. Ironically, however, SII's withdrawal from the HHED production raised the value of their products, especially among translators, and substantially boosted the demand for them. SII's electronic dictionaries were put up for online auction for outrageous prices (Sekiyama 2016b).

[15] As for the 2016 models, XD-Y5900MED includes 8 medical and 102 other resources (97,200JPY), while XD-Y5700MED incorporates 6 medical and 94 other resources (77,200JPY).

[16] Though not medical reference works *per se*, both HHEDs include the following dictionaries to help users to produce texts in English:

*Shizen Kagaku-kei Wa-ei Dai-jiten* (*New Japanese-English Dictionary of Natural Science*). 4th ed. 2009. Ogura Shoten. (153,000 refs.)

*Ronbun Supeech no Eigo Hyogen* (*New Dictionary of English Composition for Scientists*). 2012. Ogura Shoten.

[17] I owe this information to Mr. Takeshi Nakamura of Casio Computer Co.

[18] For this study, I was able to access only the Casio HHED.

[19] The middle matter consists of three parts: Color Anatomical Plates A1, B1 (anatomic planes & directions, terms of movement), and C1 (stains, blood cells, etc.). *Stedman's E-J MD* includes only the first.

[20] Since *Stedman's MD* and *Stedman's E-J MD* are basically organized in the same way, the former is mainly dealt with. The latter is referred to only where there are differences that merit mention.

[21] In *Stedman's E-J MD*, the headword banner is light pink and the end of an entry is marked by a thick horizontal line. High-profile word entries are sandwiched by thick horizontal lines.

[22] If the plural of a headword item is regular, it is abbreviated as the initial letter plus "'s": e.g., **crypt abscesse**s to **crypt a.'s** (see Appendix A). Otherwise, the item is spelled out: e.g., **angular g.** but **central gyri** (s.v. **gyrus** [xlii]).

[23] When a headword is preceded by a blue square with a letter "i" in white (e.g., **amebic a.** s.v. **abscess** in Appendix A), it indicates that the entry includes an illustration. This indication is not repeated in *Stedman MD* in HHED or in *Stedman E-J MD* in both book form and HHED.

[24] In *Stedman E-J MD*, etymological information is provided after the pronunciation.

[25] "SYN" in *Stedman's MD* (both print and HHED) corresponds to *Stedman's E-J MD*'s "=" (print) and "=⇨" (HHED), "SEE" to "→" and "→⇨," "SEE ALSO" to "⟶" and "⟶⇨," and "Cf." to "*cf.*" and "*cf.* ⇨," respectively.

[26] In *Stedman's E-J MD*, the italics are maintained.

[27] The highlight should be applied to two or more words to make the transfer to the exact entry possible.

[28] *Stedman's E-J MD* appears as the eighth.

[29] This function is not available for the pictorial illustrations included in entries in *Stedman's MD* or in *Stedman's E-J MD*.

[30] It is not clear what changes and modifications are allowed to be made to a published print dictionary by the manufacturer when it is adapted for use in an HHED.

[31] *Eijiro* (English-Japanese database-cum-dictionary, available in CD-ROM and online) allows the collocation search on the basis of a combination of English and Japanese words as key words (Yamada 2010: 418). If this kind of search can be run on *Stedman's MD* and *Stedman's E-J MD*, it will mean trawling through the whole texts of both dictionaries for collocations with a larger and finer-mesh net.

[32] The collocation search will help Japanese/English-speaking students in production, reception, and learning of English/Japanese, linguists and lexicographers in identifying collocations and verifying their meanings, and lexicographers in standardizing description.

[33] Professor Rumi Takahashi (personal communication) and her colleagues at Showa University observe that almost no medical students use HHEDs relying instead on Internet-based resources such as *Life Science Dictionary* (medical dictionary portal: http://www.life-science-dictionary.com/cgi-bin/lsdproj/ejlookup04.pl) and *weblio* (dictionary portal: http://ejje.weblio.jp/). Professor Shigeru Mori at the Medical School of Oita University and Dr. Sayaka Sugimoto at the Medical School of Juntendo University (both personal communication) share a similar observation. Professor Mori teaches his students to use such websites as the New England Journal of Medicine (https://www.nejm.org/) to check medical collocations.

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# APPENDIX A

*STEDMAN'S MEDICAL DICTIONARY.* 28TH ED. 2006

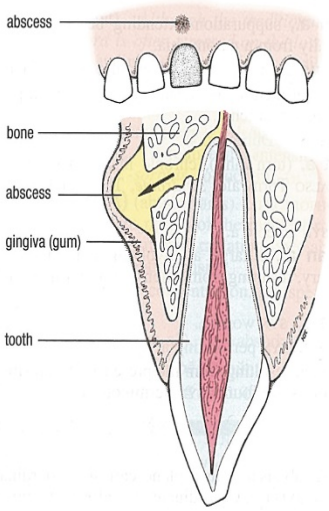


## ABSCESS

**ab·scess** (ab′ses). *Avoid the misspellings* abcess *and* absess. *Avoid the mispronunciation* ab′sĕ-sēz *of the plural of this word.* **1.** A circumscribed collection of purulent exudate frequently associated with swelling and other signs of inflammation. **2.** A cavity formed by liquefactive necrosis within solid tissue. [L. *abscessus,* a going away]

**acute a.,** a recently formed a. with little or no fibrosis in the wall of the cavity. SYN hot a.

**alveolar a.,** an a. situated within the alveolar process of the jaws, most often caused by extension of infection from an adjacent nonvital tooth. See this page. SYN dental a., dentoalveolar a., root a.




**alveolar abscess:** sagittal section

**amebic a.,** an area of liquefaction necrosis of the liver or other organ caused by amebae; its development can follow amebic dysentery. See page C13. SYN tropic a.

**apical a.,** SYN periapical a.

**apical periodontal a.,** SYN periapical a.

**appendiceal a.,** an intraperitoneal a., usually in the right iliac fossa, resulting from extension of infection in acute appendicitis, especially with perforation of the appendix. SYN periappendiceal a.

**Bartholin a.** (bahr′tō-lĭn), an a. of the vulvovaginal gland.

**Bezold a.** (bāt′sōlt), an a. deep to the superior part of the sternocleidomastoid muscle due to suppurative destruction of the mastoid tip cells in mastoiditis.

**bicameral a.,** an a. with two separate cavities or chambers.

**bone a.,** suppuration within the medullary cavity (osteomyelitis), cortex, or periosteum of bone.

**Brodie a.** (brō′dē), a chronic a. of bone surrounded by dense fibrous tissue and sclerotic bone; may represent area of resolved currently inactive suppuration.

**bursal a.,** suppuration within a bursa.

**caseous a.,** an a. containing white solid or semisolid material of cheeselike consistency; usually tuberculous. SYN cheesy a.

**cheesy a.,** SYN caseous a.

**cholangitic a.,** a focal area of pus formation in the liver that results from infection arising in the biliary tract.

**chronic a.,** a long-standing collection of pus surrounded by fibrous tissue.

**cold a.,** an a. without heat or other usual signs of inflammation.

**crypt a.'s,** a.'s in crypts of Lieberkühn of the large intestinal mucosa; a characteristic feature of ulcerative colitis.

**dental a., dentoalveolar a.,** SYN alveolar a.

**diffuse a.,** a collection of pus not circumscribed by a well-defined capsule.

**Douglas a.** (dŭg′lăs), suppuration in Douglas pouch.

**dry a.,** the remains of an a. after the pus is absorbed.

**Dubois a.'s** (dū-bwah′), small cysts of the thymus containing polymorphonuclear leukocytes but lined by squamous epithelium; reported in congenital syphilis but also found in the absence of syphilis. SYN Dubois disease, thymic a.'s.

**embolic a.,** an a. arising distal to the point of arrest of a septic embolus.

**epidural a.,** a lesion found between the cranium (skull) and dura mater; often due to infection in mastoid and frontal sinuses, to trauma, and, in the context of emergency medicine, to illicit injecting drug use.

**fecal a.,** SYN stercoral a.

**follicular a.,** an a. in a hair, tonsillar, or other follicle.

**gas a.,** an a. containing gas. Frequently caused by gas-forming organisms such as *Enterobacter aerogenes* or *Escherichia coli.*

**gingival a.,** an a. confined to the gingival soft tissue. SYN gumboil, parulis.

**gravitation a.,** SYN perforating a.

**gummatous a.,** an a. due to the softening and breaking down of a gumma, especially in bone.

**hematogenous a.,** an a. caused by blood-borne organisms.

**hot a.,** SYN acute a.

**hypostatic a.,** SYN perforating a.

**ischiorectal a.,** an a. involving the ischiorectal fossa.

**lateral alveolar a.,** an alveolar a. located along the lateral root surface of a tooth. SYN pericemental a.

**lateral periodontal a.,** an a. that forms at the depth of a periodontal pocket due to multiplication of pyogenic microorganisms or the presence of foreign material.

**lung a.** (lŭng), an a. in the lung parenchyma, diagnosed as such by cavitation, bronchial communication, and replacement of some air by pus.

**mastoid a.,** an a. due to coalescence of the mastoid air cells in mastoiditis.

**metastatic a.,** a secondary a. formed, at a distance from the primary focus, as a result of the transportation of pyogenic bacteria by the lymph or bloodstream.

**migrating a.,** SYN perforating a.

**miliary a.,** one of a number of minute collections of pus, widely disseminated throughout an area or the whole body.

**Munro a.** (mŭn-rō′), SYN Munro *microabscess.*

**orbital a.,** a collection of pus often located between the orbital periosteum and the lamina papyracea; frequently an extension of purulent infection of the paranasal sinuses, usually the ethmoids.

**otitic a.,** a brain a., usually involving the temporal lobe or cerebellar hemisphere, secondary to suppuration of the middle ear.

**palatal a.,** (**1**) a lateral periodontal a. associated with the lingual surface of a maxillary tooth; (**2**) an alveolar a. that has eroded the cortical plate, allowing extension into the palatal soft tissues.

**pancreatic a.,** an a. in the pancreatic or peripancreatic area usually related to pancreatitis.

**parafrenal a.,** an a. that occurs on either side of the frenum of the penis.

**parametric a., parametritic a.,** an a. in the connective tissue of the broad ligament of the uterus.

**paranephric a.,** an a. in the region of the kidney, outside the Gerota (renal) fascia.

**parapharyngeal a.,** an a. lying lateral to the pharynx.

**parotid a.,** suppuration in the parotid gland; an often rapidly progressing complication of parotitis. See page B22.

**Pautrier a.** (pō-trē-ā′), SYN Pautrier *microabscess.*

**pelvic a.,** an a. in the pelvic peritoneal cavity, developing as a complication of diffuse peritonitis or of localized peritonitis associated with abdominal or pelvic inflammatory disease, such as

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salpingitis; the pus frequently collects in the rectovesical or rectouterine pouch.

**perforating a.,** an a. that breaks down tissue barriers to enter adjacent areas. SYN gravitation a., hypostatic a., migrating a., wandering a.

**periapical a.,** an alveolar a. localized around the apex of a tooth root. SYN apical a., apical periodontal a.

**periappendiceal a.,** SYN appendiceal a.

**periarticular a.,** an a. surrounding a joint, but not necessarily involving it.

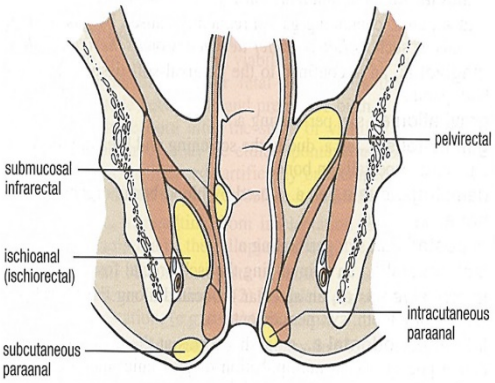
**pericemental a.,** SYN lateral alveolar a.

**pericoronal a.,** an a. developing in the inflamed dental follicular tissue overlying the crown of a partially erupted tooth.

**perinephric a.,** an a. within the Gerota fascia but outside the renal capsule.

**periodontal a.,** an alveolar a. or a lateral periodontal a.

**perirectal a.,** an a. in connective tissue adjacent to the rectum or anus. See this page.




**perirectal (supralevator) abscesses** (yellow areas indicate abscesses)

**peritonsillar a.,** extension of tonsillar infection beyond the tonsillar capsule with abscess formation between the capsule and the musculature of the tonsillar fossa.

**periureteral a.,** an a. surrounding the ureter.

**periurethral a.,** an a. involving the tissues around the urethra, particularly the corpus spongiosum.

**phlegmonous a.,** circumscribed suppuration characterized by intense surrounding inflammatory reaction that produces induration and thickening of the affected area.

**Pott a.** (pot), tuberculous a. of the spine.

**premammary a.,** an a. in the subcutaneous tissue covering the mammary gland.

**psoas a.,** an a., usually tuberculous, originating in tuberculous spondylitis and extending through the iliopsoas muscle to the inguinal region.

**pulp a.,** an a. involving the soft tissue within the pulp chamber of a tooth, usually a sequela of caries or less frequently of trauma.

**pyemic a.,** a hematogenous a. resulting from pyemia, septicemia, or bacteremia. SYN septicemic a.

**radicular a.,** alveolar a., an a. around a tooth root.

**residual a.,** an a. recurring at the site of a former a.; results from persistence of microbes and pus.

**retrobulbar a.,** an a. posterior to the globe of the eye.

**retrocecal a.,** an a. located posterior to the cecum, usually resulting from perforation of a retrocecal appendix.

**retropharyngeal a.,** an a. arising, usually, in retropharyngeal lymph nodes, most commonly in infants.

**ring a.,** an acute purulent inflammation of the corneal periphery in which a necrotic area is surrounded by an anular girdle of leukocytic infiltration.

**root a.,** SYN alveolar a.

**satellite a.,** an a. closely associated with a primary a.

**septicemic a.,** SYN pyemic a.

**stellate a.,** a star-shaped necrotic area surrounded by histiocytes, seen within swollen lymph nodes in lymphogranuloma venereum and cat scratch fever.

**stercoral a.,** a collection of pus and feces. SYN fecal a.

**sterile a.,** (1) an a. with contents that are not caused by pyogenic bacteria. (2) an a. that when aspirated or cultured does not grow bacteria.

**stitch a.,** SYN suture a.

**subdiaphragmatic a.,** SYN subphrenic a.

**subepidermal a.,** a microscopic a. located in the dermis just beneath the epidermis.

**subhepatic a.,** an a. located immediately beneath the liver.

**subperiosteal a.,** an a. between the periosteum and cortical plate of the bone.

**subphrenic a.,** an a. directly beneath the diaphragm. SYN subdiaphragmatic a.

**subungual a.,** suppuration extending beneath a fingernail or toenail, usually from a paronychia.

**sudoriferous a.,** a collection of pus in a sweat gland.

**suture a.,** a purulent exudate surrounding a stitch, particularly a corneal stitch. SYN stitch a.

**thymic a.'s,** SYN Dubois a.'s.

**Tornwaldt a.** (torn'vahlt), chronic infection of the pharyngeal bursa. SEE ALSO Tornwaldt *syndrome*, Tornwaldt *cyst*, Tornwaldt *disease*.

**tropic a.,** SYN amebic a.

**tuboovarian a.,** a large a. involving a uterine tube and an adherent ovary, resulting from extension of purulent inflammation of the tube.

**verminous a.,** SYN worm a.

**wandering a.,** SYN perforating a.

**worm a.,** an a. resulting from the presence of parasitic worms or in which worms are found. SYN verminous a.

**ab·scis·sa** (ab-sis'ă). In a plane cartesian coordinate system, the horizontal axis (*x*). Cf. ordinate. [L. *ab-scindo*, pp. *-scissus*, to cut away from]

**ab·scis·sion** (ab-si'shŭn). *Avoid the mispronunciation* ab-si-'zhŭn. Cutting away. [L. *ab-scindo*, pp. *-scissus*, to cut away from]

**ab·scon·si·o** (ab-skon'sē-ō). A recess, cavity, or depression; used especially in osteology to denote a bony cavity that accommodates the head of another bone. [Mod. L. fr. *abs-condo*, pp. *-conditus* or *-consus*, to hide]

**ab·sco·pal** (ab-skō'păl, -skop'ăl). Denoting the effect that irradiation of a tissue has on remote nonirradiated tissue. [ab- + G. *skopos*, target, + -al]

**ab·sence** (ahb-sahns'). *This word, based on French* absence *'fit of abstraction', is correctly pronounced as in French,* ahb-sahns', *as shown here.* Paroxysmal attacks of impaired consciousness, occasionally accompanied by spasm or twitching of cephalic muscles, which usually can be brought on by hyperventilation; depending on the type and severity of the a., the EEG may show an abrupt onset of a 3-second spike-and-wave pattern as in simple a., or in atypical cases a 4-second spike-and-wave or faster spike complexes. The clinical states accompanying these EEG abnormalities may be classified as: 1) a. with no overt manifestations, e.g., simple a.; epileptic a.; subclinical a.; 2) a. with clonic movements, e.g., myoclonic a.; 3) a. with atonic states, e.g., atonic a.; 4) a. with tonic contractions, e.g., hypertonic muscular contraction; 5) a. with automatisms, e.g., various stereotypic movements, usually of the face or hands; 6) a. with atypical features, e.g., bizarre motor activity. [L. *absentia*]

**pure a.,** SYN simple a.

**simple a.,** a brief clouding of consciousness accompanied by the abrupt onset of 3-second spikes and waves on EEG. SYN pure a.

**abs. feb.** Abbreviation for L. *absente febre*, when fever is absent.

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# APPENDIX B

## *STEDMAN'S ENGLISH-JAPANESE MEDICAL DICTIONARY*. 6TH ED. 2008



**a·bor·tion** (AB) (ă-bōr′shŭn). *1* 流産（子宮外での成育が不可能な胎芽または胎児(妊娠 20 週すなわち胎齢 18 週未満，または体重 500 g 未満)を娩出すること．子宮外で成育可能であるが妊娠 37週未満で娩出される早産とは区別される．流産には自然流産と人工流産がある．㊟日本における流産の定義は妊娠 22 週未満での胎芽または胎児の娩出である）．*2* 中絶（正常の妊娠終了以前にその経過を中断すること）．

**ampullar a.** 卵管膨大部流産（卵管膨大部に着床し胎児が発育したものが流産すること）．

**complete a.** 〔完〕全流産（①胎児または胎芽が母体から完全に排出されること．②妊娠による他の子宮内容(例えば枯死卵)の完全な排出）．

**criminal a.** 犯罪流産，堕胎（違法に行われる妊娠中絶）．＝illegal a.

**elective a.** 人工妊娠中絶（医学的適応以外であるが合法的な中絶(米国におけるような実施)）．

**habitual a.** 習慣〔性〕流産．＝recurrent a.

**illegal a.** 違法な流産．＝criminal a.

**incomplete a.** 不全流産（妊娠子宮の内容の一部は排出されたが，一部(通常は胎盤)は子宮内に残っている流産）．

**induced a.** 人工流産（薬物または機械的方法を用いて人工的に行われる流産）．

**inevitable a.** 進行流産（不正性器出血および子宮収縮があり，破水あるいは頸管開大を伴う胎児生育可能限界以前の流産）．

**infected a.** 感染性流産（流産の感染性合併症）．

**menstrual extraction a.** 月経抽出法，人工流産（予定月経が数日間遅れた妊娠の初期に子宮の内容物を吸引する妊娠中絶法）．

**missed a.** 稽留流産（胎児は子宮内で死んでいるが，妊娠産物は 2 か月以上(㊟日本では 2 か月以上とはいわない)，子宮内に残っている流産）．

**recurrent a.** 反復流産（妊娠 20 週以前の 3 回以上の連続流産）．＝habitual a.

**septic a.** 敗血〔性〕流産（発熱，子宮内膜炎，子宮傍結合組織炎を伴う感染性流産）．

**spontaneous a.** 自然流産（人工的誘発によらない流産）．＝miscarriage.

**therapeutic a.** 治療的流産（母体の身体的または精神的健康の保持のため，または先天奇形児や強姦によりできた胎児が生まれないように人工的に行う流産．㊟日本では先天奇形児出産防止のための治療的流産は認められていない）．

**threatened a.** 切迫流産（妊娠 20 週(㊟日本では 22 週)未満に，出血の有無にかかわらず痙攣性の痛みがみられることであり，その後に胎児の排出が起こり得る状態をいう）．

**tubal a.** 卵管流産（子宮外妊娠の部位となった卵管内から卵管采を経て妊卵が排出されること．または卵管の破裂により妊卵が排出されること）．＝aborted ectopic pregnancy.

**a·bor·tion·ist** (ă-bōr′shŭn-ist). 人工流産施行者（人工流産を行う人）．

**a·bor·tive** (ă-bōr′tiv) [L. *abortivus*]. *1* 頓挫性の（完了しない(例えば疾病の発作が完全に進行しない)うちに治まる場合などをいう）．*2* 不全型の．＝rudimentary. *3* 流産の．＝abortifacient (1).

**a·bor·tus** (ă-bōr′tŭs) [L.]. 流産児（[abortus の複数形は aborti でも aborta でもなく abortus である．〝流産を経験した女性〟を意味する aborta のような語はない]．流産の結果出てくるもの）．

**a·bou·li·a** (ă-bū′lē-ă). ＝abulia.

**ABP** androgen binding *protein* の略．

**ABPA** allergic bronchopulmonary *aspergillosis* の略．

**ABR** auditory brainstem *response* の略．

**a·bra·chi·a** (ă-brā′kē-ă) [G. *a-* 欠性辞 + *brachiōn*, arm]. 無腕〔症〕(腕の先天的欠損．⇀amelia)．

**a·bra·chi·o·ceph·a·ly, a·bra·chi·o·ce·pha·lia** (ă-brā′kē-ō-sef′ă-lē, -se-fā′lē-ă) [G. *a-* 欠性辞 + *brachiōn*, arm + *kephalē*, head]. 無腕無頭〔症〕(腕と頭の先天的欠損)．＝acephalobrachia.

**a·brade** (ă-brād′) [L. *ab-rado*, pp. *-rasus*, to scrape off]. *1* 磨耗する（機械的行為で磨滅する）．*2* 剝離する，掻爬する，擦過する（ある部分から一部分または全部の表層を削り取る）．

**A·bra·hams** (ā′bră-hamz), Robert. 米国人医師，1861—1935. ⇀A. *sign*.

**A·brams** (ā′brămz), Albert. 米国人医師，1863—1924. ⇀A. heart *reflex*.

**a·bra·sion** (ă-brā′zhŭn) [⇀abrade]. *1* 擦過傷，表皮剝脱（すり傷，または皮膚や粘膜の限局性表皮剝離）．＝abraded wound. *2* 剝離，剝脱，掻爬〔術〕(表面の一部を削り取ること)．*3* 磨耗（歯科において誤った歯の磨き方，異物の存在，歯ぎしり，あるいはそれに類似した原因で歯が病的にすり減ること．*cf.* attrition)．＝grinding.

**brush burn a.** ⇀brush *burn*.

**gingival a.** 歯肉磨耗（表面上皮の一部の機械的な除去による歯肉の損傷）．

**tooth a.** 歯の磨耗〔症〕(食物以外の磨耗性物質によって歯の組織が欠損したり，すり減ること)．

**a·bra·sive** (ă-brā′siv). *1* [adj.] 剝離の，剝脱の，磨耗の．*2* [n.] 表皮剝脱材（表皮剝脱に用いる物質）．*3* [n.] 研磨剤（歯科において用いる，磨耗，削合，または研磨用の物質）．

**a·bra·sive·ness** (ă-brā′siv-nes). 摩損性（①摩擦により表面の磨耗をもたらす物質の特性．②他の物体を引っ掻いたり，すり減らすことが可能な性質）．

**ab·re·act** (ab-rē-akt′). 発散する，解除する，解放する（①外傷的体験を発散させる際に，激しい感情を示す．②抑圧された感情を解放または解除する）．

**ab·re·ac·tion** (ab-rē-ak′shŭn). 解除反応，解放反応（Freud の精神分析において，過去の抑圧された不快な体験を意識野に再現させることにより，情動の解放あるいはカタルシスが行われる現象）．

**motor a.** 運動〔性〕解除(解放)反応（体動あるいは筋肉運動により，無意識に思考，観念，衝動を解放すること）．

**ab·rin** (ab′rin). アブリン（トウアズキ *Abrus precatorius* や Indian glycyrrhiza の種子に含まれる毒物で，服用すると出血・溶血を起こす．眼科で用いられる）．

**ab·rup·tion** (ab-rŭp′shŭn). 剝離（くっついているものを引きはがす，分離する，あるいは引き離すこと）．

**ab·rup·tio pla·cen·tae** (ab-rŭp′shē-ō pla-sen′tē). 常位胎盤早〔期〕剝〔離〕([誤ったつづりまたは発音 abruptio placenta を避けること]．正常な位置にある胎盤が早期に剝離すること）．

***Ab·rus*** (ā′brŭs) [より正確には *Habrus* < G. *habros*, graceful]. トウアズキ属（マメ科の植物．インド甘草であるトウアズキ *A. precatorius* の根は甘草の代わりとして用いることもある．その種子には毒性があり，かむと嘔吐，下痢，痙攣，ひいては死をまねくこともある）．

## ABSCESS

**ab·scess** (ab′ses) [L. *abscessus*, a going away]. 膿瘍（[誤ったつづり abcess および absess を避けること．本語の複数形の誤った発音 ab′sĕ-sēz を避けること]．①膿状の滲出物の限局性集積で，しばしば腫脹や他の炎症徴候を伴う．②固形組織内の液化壊死によって形成された窩洞）．

**acute a.** 急性膿瘍（新しくできた膿瘍で，窩洞壁に線維形成がほとんど，あるいはまったくみられない)．＝hot a.

**alveolar a.** 歯槽膿瘍（顎骨の歯槽突起内にみられる膿瘍で，そのほとんどが当該する失活歯に起因した感染が拡大波及することにより生じる)．＝dental a.; dentoalveolar a.; root a.

**amebic a.** アメーバ性膿瘍（アメーバによって引き起こされる肝臓または他の器官の液化壊死の部分．アメーバ赤痢に引き続いて起こり得る)．＝tropic a.

**apical a.** 根尖膿瘍．＝periapical a.

**apical periodontal a.** 根尖歯周膿瘍．＝periapical a.

**appendiceal a.** 虫垂炎膿瘍（通常，右腸骨窩にみられ，急性虫垂炎，特に虫垂穿孔を伴う場合の，感染の拡大により生じる腹腔内膿瘍)．＝periappendiceal a.

**Bartholin a.** (bahr′tō-lĭn). バルトリン〔腺〕膿瘍（大前庭腺の膿瘍）．

**Bezold a.** (bāt′sōlt). ベツォルト膿瘍（乳様突起炎で乳突

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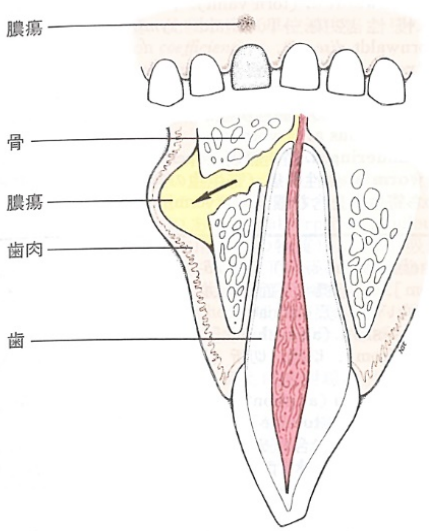


**alveolar abscess**
矢状断.

蜂巣洞の化膿性破壊による胸鎖乳突筋の上部に及ぶ深部膿瘍).

**bicameral a.** 二房性膿瘍（２分された腔または房をもつ膿瘍).

**bone a.** 骨膿瘍（骨髄腔内の化膿(骨髄炎)，骨皮質または骨膜の化膿).

**Brodie a.** (brō′dē). ブローディー膿瘍（密な線維組織と硬化した骨で囲まれた骨の慢性膿瘍．治まっている現在は不活性な化膿の部位を示すこともある).

**bursal a.** 滑液包膿瘍，滑液嚢膿瘍（滑液包内の化膿).

**caseous a.** 乾酪性膿瘍（チーズ様の硬さの白色の固体または半固体が含まれる膿瘍．通常は結核性膿瘍). =cheesy a.

**cheesy a.** 乾酪〔性〕膿瘍. =caseous a.

**cholangitic a.** 胆管炎膿瘍（胆道感染に由来する肝臓の膿瘍巣).

**chronic a.** 慢性膿瘍（長期にわたり，線維組織に囲まれた場所へ膿がたまっている状態).

**cold a.** 冷膿瘍，寒性膿瘍（熱やその他の炎症の徴候を欠く膿瘍).

**crypt a.'s** 陰窩膿瘍（大腸粘膜の腸腺の膿瘍．潰瘍性大腸炎の特徴).

**dental a., dentoalveolar a.** 歯性膿瘍. =alveolar a.

**diffuse a.** びまん性膿瘍（はっきりした被膜で限局されていない状態で膿が集まっている膿瘍).

**Douglas a.** (dŭg′lăs). ダグラス〔窩〕膿瘍（Douglas 窩の膿瘍).

**dry a.** 乾性膿瘍（膿が吸収された後の膿瘍の残遺物).

**Dubois a.'s** (dū-bwah′). デュボワ膿瘍（多形核球を含む，扁平上皮で区切られた胸腺の小さい嚢腫．先天梅毒にみられるという報告もあるが，梅毒でない場合もある). =Dubois disease; thymic a.'s.

**embolic a.** 塞栓性膿瘍（感染症性栓子の塞栓部の末梢に生じる膿瘍).

**epidural a.** 硬膜外膿瘍（頭蓋骨と硬膜との間に生じる膿瘍で，乳様突起や前頭洞の感染や外傷，救急医療の状況における違法な注射薬使用などが原因で生じる).

**fecal a.** 糞便〔性〕膿瘍. =stercoral a.

**follicular a.** 濾胞性膿瘍，小胞性膿瘍（毛髪，扁桃，その他の小胞内の膿瘍).

**gas a.** ガス膿瘍（ガスを含む膿瘍，しばしば *Enterobacter aerogenes*，大腸菌 *Escherichia coli*，その他のガス産生微生物により生じる).

**gingival a.** 歯肉膿瘍（歯肉の軟組織に限局した膿瘍). = gumboil; parulis.

**gravitation a.** 流注膿瘍. =perforating a.

**gummatous a.** ゴム腫性膿瘍（ゴム腫が軟化したり，崩れて起こる膿瘍で，特に骨内でみられる).

**hematogenous a.** 血行性膿瘍（血液で運ばれる細菌により生じる膿瘍).

**hot a.** 熱膿瘍. =acute a.

**hypostatic a.** 就下性膿瘍. =perforating a.

**ischiorectal a.** 坐骨直腸膿瘍（坐骨直腸窩内に生じる膿瘍).

**lateral alveolar a.** 根側膿瘍（歯根の側面に生じた歯槽膿瘍). =pericemental a.

**lateral periodontal a.** 根側歯周膿瘍（歯周ポケットの深部に生じる膿瘍で，化膿性細菌の増大や異物の存在が発症原因となる).

**lung a.** (lŭng). 肺膿瘍（肺の実質に形成された膿瘍．空洞形成，気管支との交通，あるいは膿が喀出されて空気に置き換わり，診断される).

**mastoid a.** 乳〔様〕突〔起〕膿瘍（乳様突起炎の際に乳突蜂巣が融合し生じる膿瘍).

**metastatic a.** 転移〔性〕膿瘍（化膿性細菌がリンパまたは血液により運ばれたために，一次病巣から離れた場所にできる二次膿瘍).

**migrating a.** =perforating a.

**miliary a.** 粟粒膿瘍（多くの微細な膿の集合で，局所全体または全身に広がっている膿瘍).

**Munro a.** (mŭn-rō′). マンロー膿瘍. =Munro *microabscess*.

**orbital a.** 眼窩〔内〕膿瘍（眼窩骨膜と篩骨紙様板との間に，しばしば限局的に膿が貯留したもの．副鼻腔(通常は篩骨洞)の化膿性炎症が広がったものが多い).

**otitic a.** 耳炎性膿瘍（中耳の細菌感染に続発し，通常側頭葉または小脳半球に生じる膿瘍).

**palatal a.** 口蓋膿瘍（①根側歯周膿瘍のうち，上顎歯の舌側面に由来するもの．②歯槽膿瘍のうち，口蓋の骨皮質を穿破し，口蓋の軟組織に進展したもの).

**pancreatic a.** 膵〔臓〕膿瘍（膵あるいは膵周囲の膿瘍で，通常は膵炎に関連する).

**parafrenal a.** 小帯傍〔結合〕組織膿瘍（陰茎小帯の片側に生じる膿瘍).

**parametric a., parametritic a.** 子宮傍〔結合〕組織膿瘍(子宮広靭帯の結合組織内に生じる膿瘍).

**paranephric a.** 腎傍〔結合〕組織膿瘍（Gerota 筋膜(腎筋膜)の外側に生じる膿瘍).

**parapharyngeal a.** 副咽頭腔膿瘍（咽頭の外側部の膿瘍).

**parotid a.** 耳下腺膿瘍（耳下腺における化膿．しばしば進行の急速な耳下腺炎の合併症).

**Pautrier a.** (pō-trē-ā′). ポトリエ膿瘍. =Pautrier *microabscess*.

**pelvic a.** 骨盤膿瘍（骨盤腔内の膿瘍．広汎性腹膜炎または卵管炎のような腹部か骨盤の炎症性疾患に伴う限局性腹膜炎の合併症として生じる．膿は直腸膀胱窩または直腸子宮窩内に集まることが多い).

**perforating a.** 穿孔〔性〕膿瘍（組織壁を貫いて隣接部位に侵入する膿瘍). =gravitation a.; hypostatic a.; migrating a.; wandering a.

**periapical a.** 根尖周囲膿瘍（根尖周囲に限局した歯槽膿瘍). =apical a.; apical periodontal a.

**periappendiceal a.** 虫垂周囲膿瘍. =appendiceal a.

**periarticular a.** 関節周囲膿瘍（関節周囲に生じ，必ずしも関節そのものは侵さない膿瘍).

**pericemental a.** 歯周膿瘍. =lateral alveolar a.

**pericoronal a.** 歯冠周囲膿瘍（半萌出歯の歯冠周囲の歯小嚢組織に炎症が波及して生じた膿瘍).

**perinephric a.** 腎周囲膿瘍（腎被膜外で，Gerota 筋膜を越えない膿瘍).

**periodontal a.** 歯周膿瘍（歯槽膿瘍または根側歯周膿瘍).

**perirectal a.** 直腸周囲膿瘍，肛門周囲膿瘍（直腸または肛門に隣接する結合組織内の膿瘍．次頁の図参照).

**peritonsillar a.** 扁桃周囲膿瘍（扁桃窩の被膜と筋層の間に膿瘍形成を伴う，扁桃被膜の外まで広がった扁桃感染).