

Therapeutic aquatic exercises and immersion in rheumatologic disorders

BALNEOTHERAPY

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Data sources

- Database: Medline + personal data
- Keywords: Balneotherapy, Mud, Hydrotherapy
Water
- Analysis of bibliography of retrieved articles

Study Selection

- Studies comparing the therapy spa or one of its components with any other treatment or no treatment
➔ end of 2014

Collection & data analysis

- All studies were reviewed by the same reader.
- Analysis of data used a validated checklist for internal validity (10 items)
 - ❖ adequate randomization ,
 - ❖ concealed allocation,
 - ❖ description of the interventions
 - ❖ Experienced therapists,
 - ❖ compliance of the participants,
 - ❖ Blinding of the participants (or similar lost to follow up rate
 - ❖ blinded patients or similar concomitants treatments, withdrawal and lost to follow up rates
 - ❖ therapist blinded or similar concomitants treatments, withdrawal and lost to follow up rates
 - ❖ Investigator blinded; or measures to avoid bias: preferences, cluster, Zelen, standard binary judgment)
 - ❖ Same schedule in the two groups
 - ❖ Intention to treat analysis

Data Collection and analysis

- Personal Checklist for

- ❖ Quality of statistical Analysis(4 items):

- Relevant statistical tests (normal distribution , group >30),
 - Control of false positives results by chance (main criteria, Bonferroni correction),
 - control of false negative by low statistical power
 - Intergroup comparison.

- ❖ External validity (3 items) :

- clear defined recruitment population,
 - number of patient in each step (screening, randomization, analysis),
 - clinically relevant improvement for patients (opinion of patient, MCII or PASS)

Data Collection and analysis

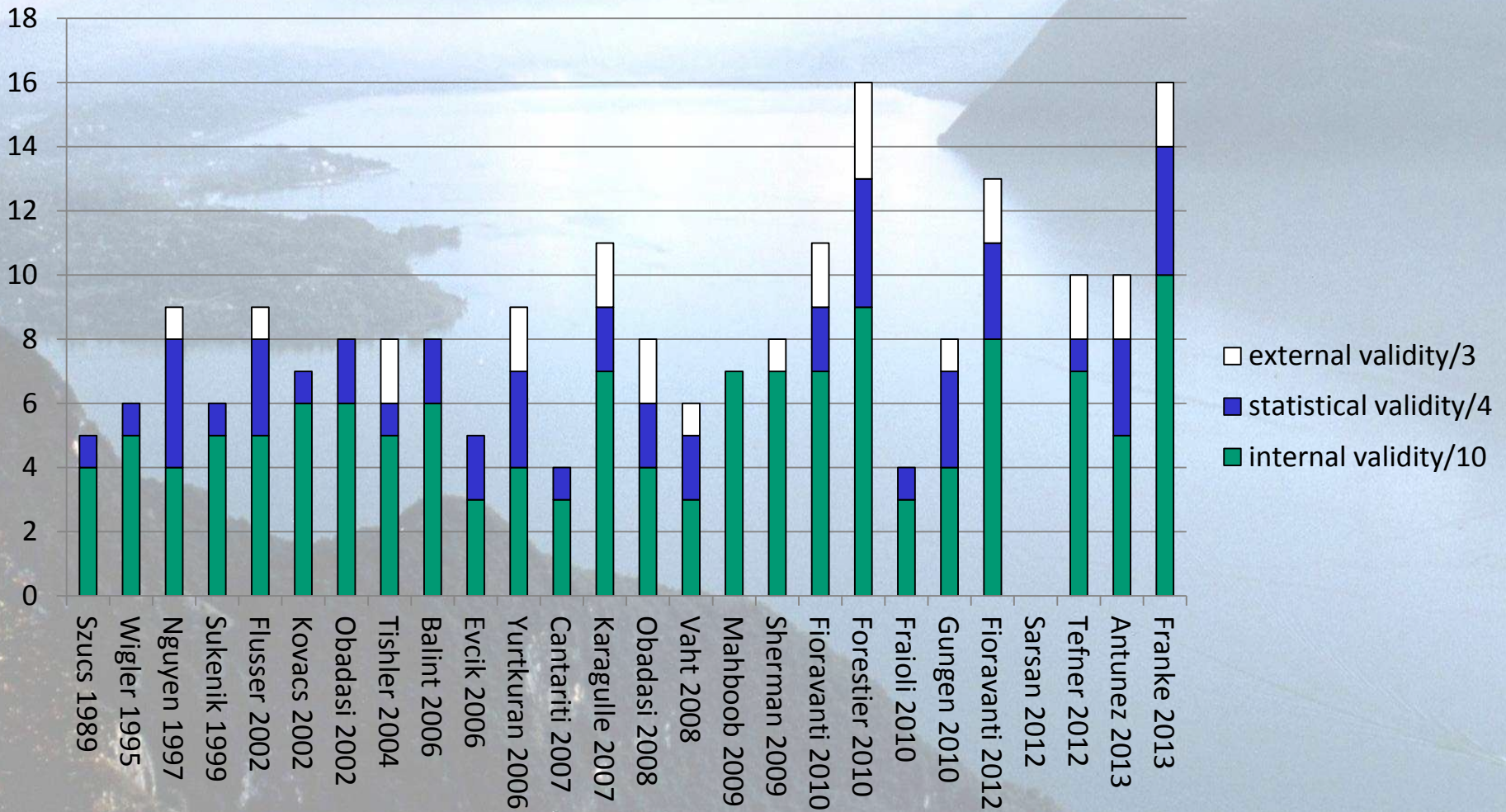
❖ Quality of the side effect evaluation

- Side effect as a judgment criteria in the method section
 - Clear evaluation of side effect in each group
 - accountability of side effect
 - Severity of side effect
- No analysis of publication bias (except for knee osteoarthritis)

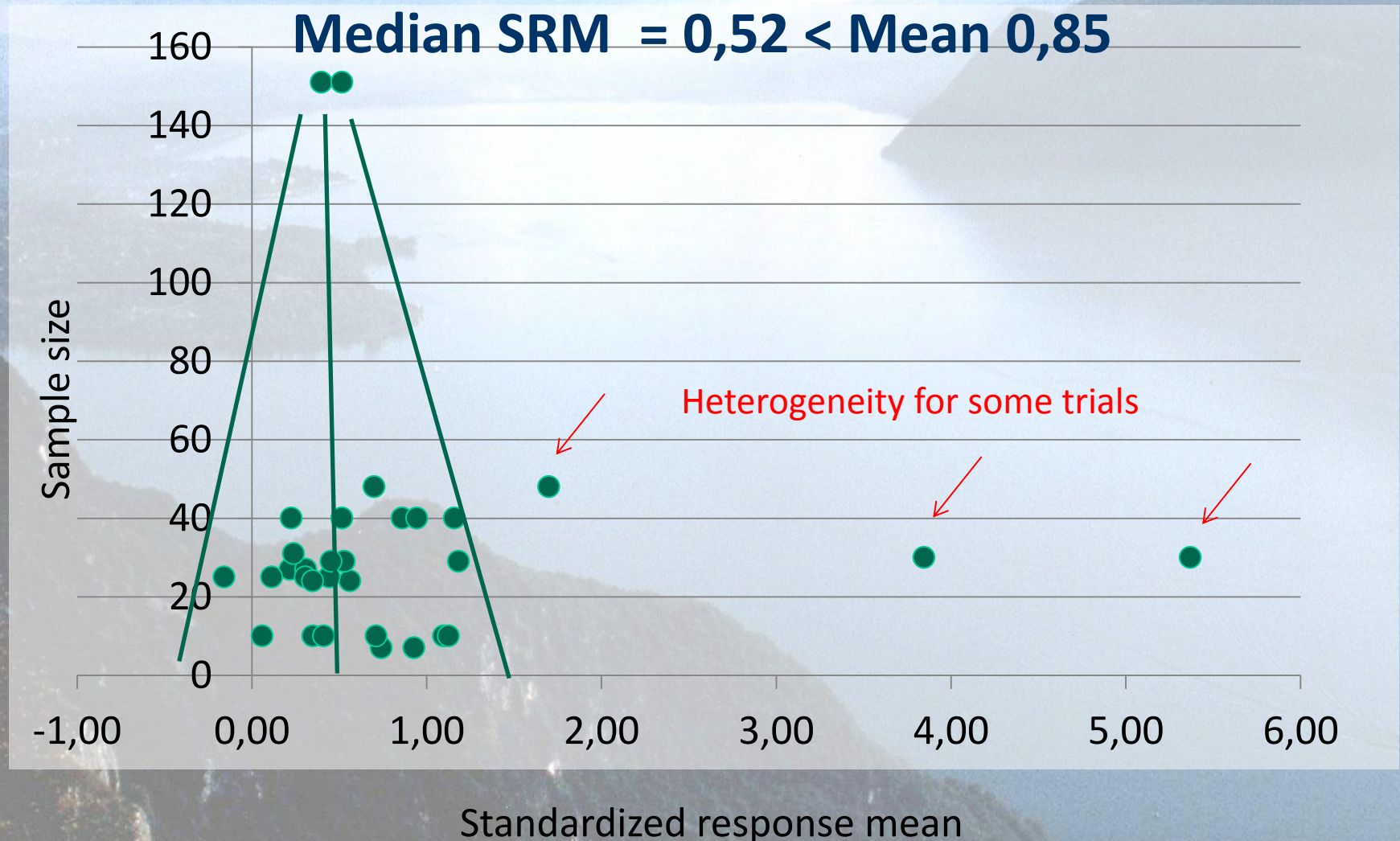


**BALNEOTHERAPY FOR
OSTEOARTHRITIS (OA)**

Methodological Quality in OA



publication bias overestimate the treatment effect



Quality of evidence in osteoarthritis

- 26 trial representing 1739 patients.
 - ❖ 3 (n=728) are of high internal validity (10→8/10) [Forestier 2010], [Franke 2013], [Fioravanti 2012]
 - ❖ 9 (n=421) are of middle validity (8→6/10) [Kovacs 2002], [Balint 2006], [[Karagülle 2007], [Mahboob 2009] [Sherman 2009] [Fioravanti 2010] [Teffner 2012] but one did not made any group comparison [Obadasi 2002]
 - ❖ 13 (n=590) are of low validity [Nguyen1997] [Cantariti 2007], [Evcik 2006], [Fraiola 2010], [Sherman 2009], [Sukenik 1999], [Szucs 1989], [Tishler 2004], [Wigler 1995], [Yurkturan 2006]
 - ❖ 1 was not available as a full text,
 - ❖ 10 studies did not make any group comparison

Osteoarthritis: multiple interventions combining mineral water and hydrotherapy techniques

- With low risk of bias spa therapy + home exercises are superior to home exercise alone at 3, 6 and 9 months and radon baths have a similar effect than bath in tap water.
- Bathing in mineral water appears to be more effective than no treatment (waiting list)
- With median risk of bias, spa therapy + home exercises is superior to no treatment (waiting list).
 - ❖ these studies use a combination of traditional balneotherapy treatment associating mineral mud, bath in mineral water and sometimes underwater massages and water exercises in mineral water.

OA & mineral water

- With median risk of bias one study found that bathing in mineral water is more effective than bathing in tap water
- The validity of other studies comparing bath in mineral water and bath in tap water is not sufficient to make any conclusion.

OA & mineral mud

- With median risk of bias there is conflicting evidence : one study found it more effective and the other found similar effect than usual care.
- With high risk of bias, mineral mud is more effective than depleted mud or covered mud.
- With high risk of bias there is no difference between mineral mud and hot pack [25].

Side effect in OA

Type of side effect	Number of affected patients/sample size	Study
Itchy	1/32	Balint 2006
Colored skin & nails	2/103	Franke 2013
Acute febrile condition	2/62	Balint 2006, Fioravanti 2012,
Upper respiratory tract infection	1/231	Forestier 2010
Erysipelas	1/231	Forestier 2010
Hypertension	3/135	Balint 2006, Franke 2013
Hypotension	1/30	Fioravanti 2012
Light side effect without interruption of spa treatment	9/25	Cantariti 2007
Fatigue	1/103	Franke 2013

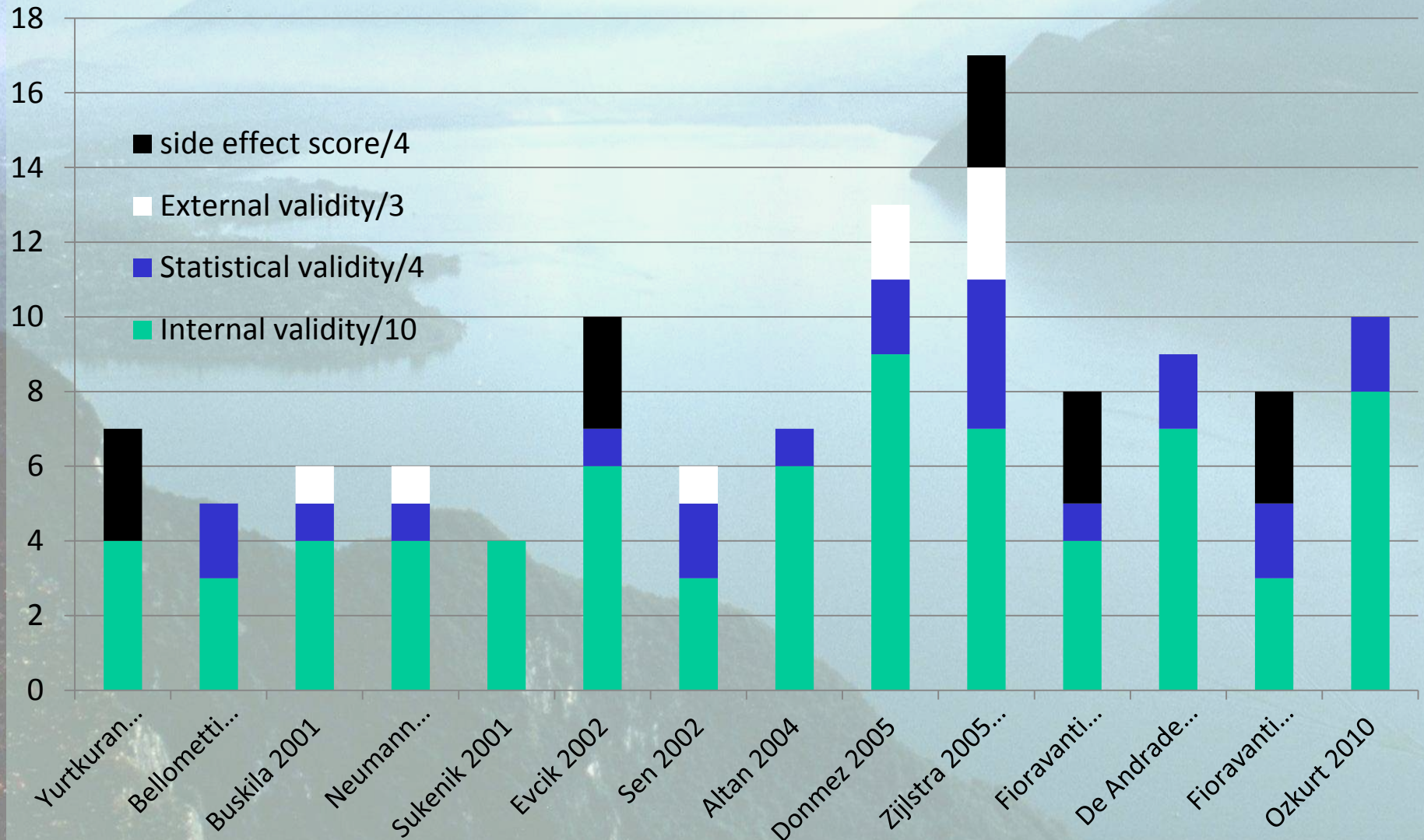
Side effect in OA

Type of side effect	Number of affected patients/sample size	Study
Painful knee episode	4/231	Forestier 2010
Low back pain	1/231	Forestier 2010
Aggravation of pain	1/103	Franke 2013
Venous insufficiency	1/231	Forestier 2010
Hematuria	1/231	Forestier 2010
Increase in diuresis	1/32	Balint 2006
No side effect	33	Wigler 1995
Not reported	1505	Antunez 2013, Evcik 2006, Fioravanti 2010, Flusser 2002, Fraioli 2010, Gungen 2010, Karagulle 2007, Kovaks 2002, Mahboob 2009, Nguyen 1997, Obadasi 2002, Obadasi 2008, Sarsan 2012, Sherman 2009, Sukenik 1999, Szucs 1989, Teffner 2012, Tishler 2004, Yurtkuran 2006

An aerial photograph of a large, calm lake surrounded by dark, forested mountains. The sky is bright with some clouds. The water reflects the light, creating a shimmering effect. The text "BALNEOTHERAPY FOR FIBROMYALGIA" is overlaid in the lower-left quadrant in a bold, blue, sans-serif font.

**BALNEOTHERAPY FOR
FIBROMYALGIA**

Methodological Quality in fibromyalgia



Quality of evidence in Fibromyalgia

- In fibromyalgia we analyzed 14 trials (n = 742 patients)
 - ❖ 2 study realized in a spa center has a low risk of bias (but 1 has a low statistical power (n=30) [Donmez 2005] and the other did not perform any group comparison (Ozkurt 2010)
 - ❖ 4 studies have a median risk of bias (n=350) (de andrade 2008) [Zijlstra 2005 & 2007] (Altan 2004) (Evcik 2002) But only one performed group comparison with a sufficient statistical power
 - ❖ The others have a high risk of bias

Fibromyalgia

- The best study
 - ❖ Compare a treatment with mineral water or sea water with no treatment (waiting list with Zelen randomization)
 - ❖ It shows a improvement of pain , fibromyalgia impact questionnaire, tender point count, opinion of patient & fatigue.
 - Bathing in mineral water in mineral water is superior to no treatment
 - Water exercise in sea water + education program + recreational activities + home exercises are superior to home exercises

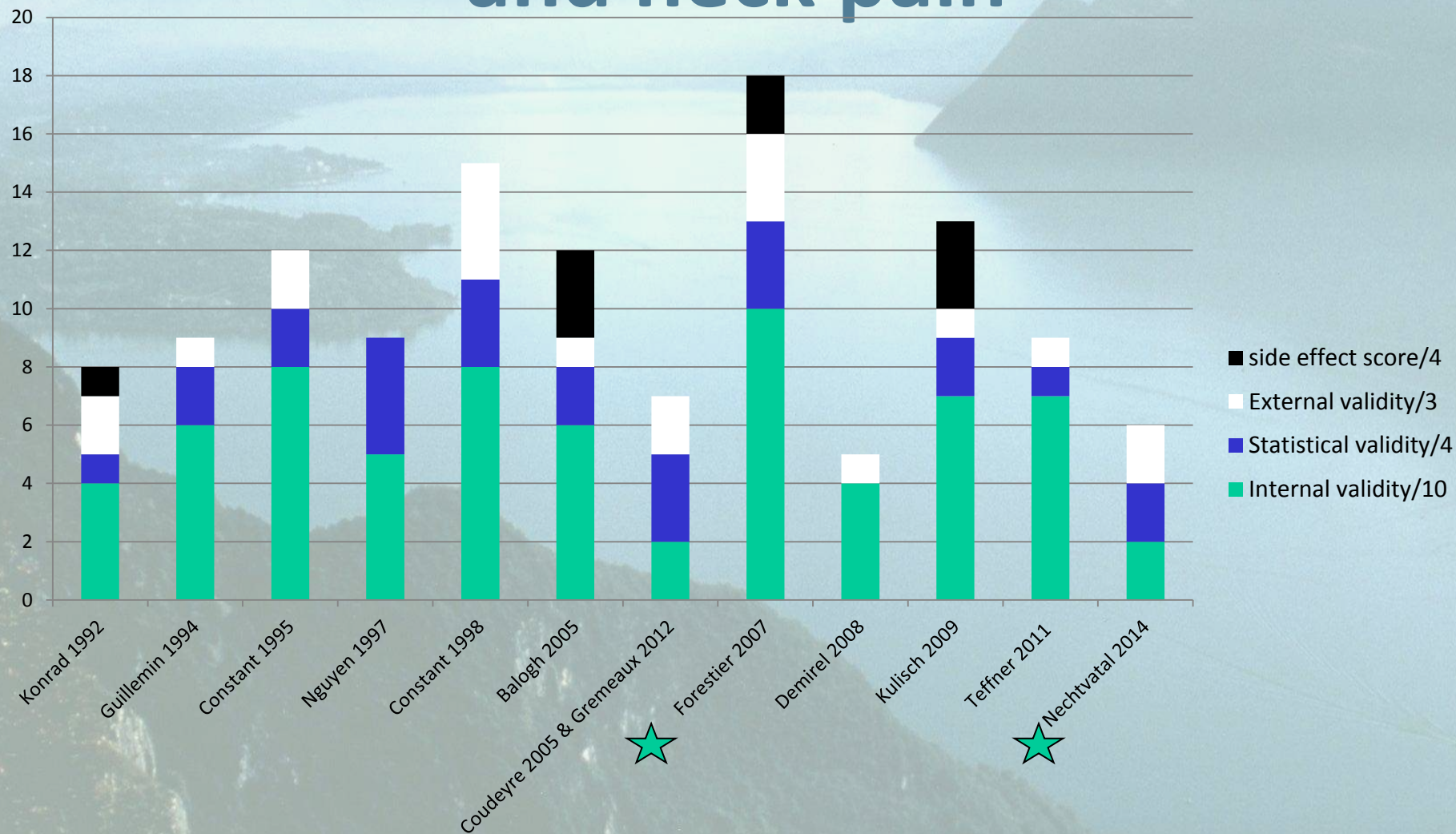
Side effect in fibromyalgia

- Are reported in 4 of the balneotherapy studies
 - ❖ On report 2 transient erythema
 - ❖ One muscle pain in exercise group
 - ❖ One that no side effect were observed
 - ❖ One that no side effects were related to the treatment

An aerial photograph of a large, calm lake surrounded by dark, forested mountains. The water is a deep blue, and the sky is a pale, hazy blue. The text is overlaid on the lower left portion of the image.

**BALNEOTHERAPY FOR BACK AND
NECK PAIN**

Methodological quality in back and neck pain



Low back pain

- In low back pain evidence is based on 10 trial (n=1301 patients)
 - ❖ 2 have low and 2 have median risk of bias (n= 481)
Constant 1995 Constant 1998 Kulisch 2009. & Teffner 2011
 - ❖ 5 have low validity (n= 820) Balogh 2005, Coudeyre 2005 & Gremeaux 2012, Demirel 2008, Guillemin 1994 and Nguyen 1997

Balneotherapy in low back pain

- With low risk of bias a complex intervention associating bath, showers and mud improve more pain , quality of life, sometimes function and drug intake than usual care (waiting list) at 3 or 6 months,
- With median risk of bias comparison between mineral water and flat water remain inconclusive because of lack of statistical power,
- With high risk of bias an education program delivered during a spa treatment improve more fear, avoidance and patient agreement than single information

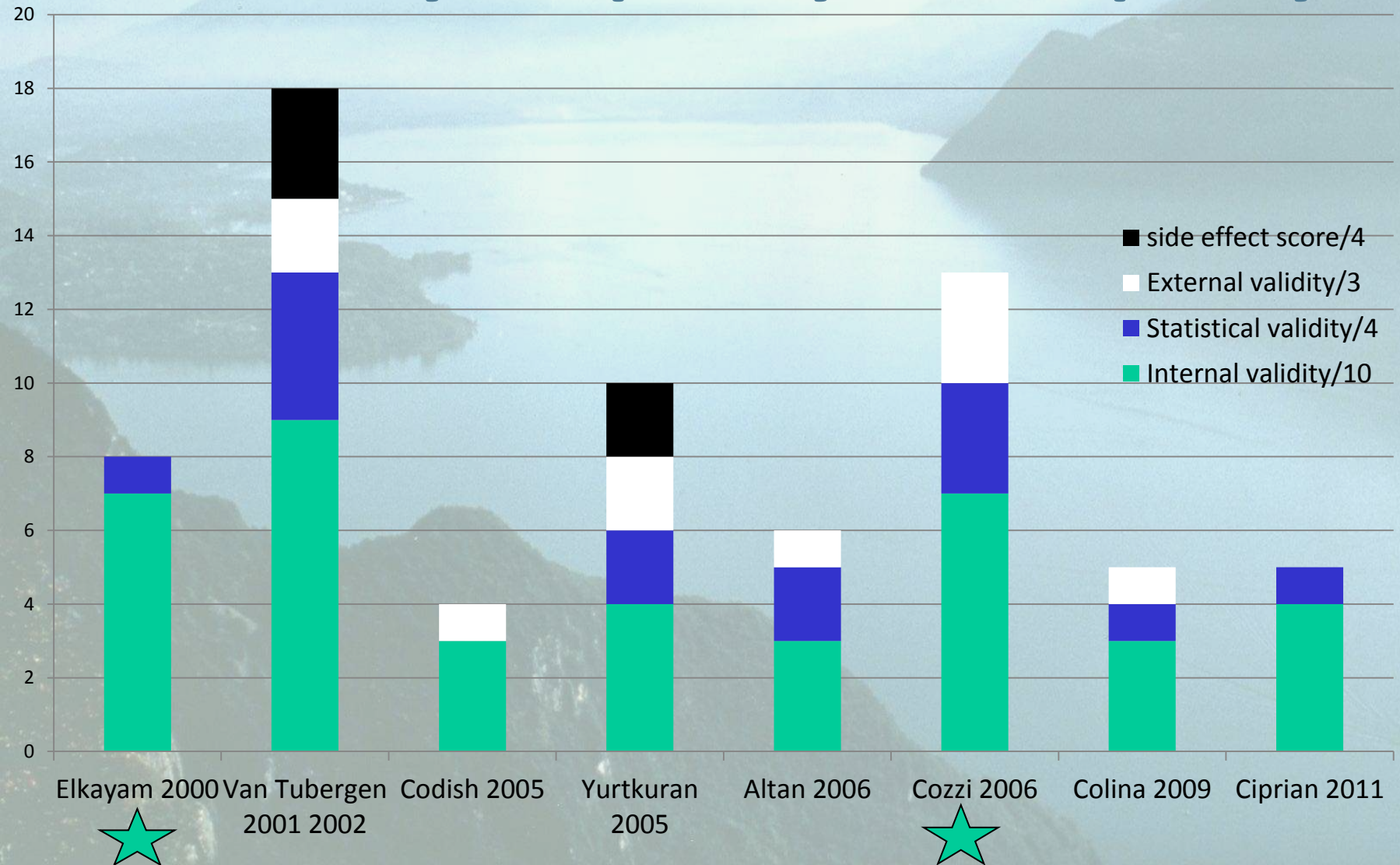
Chronic neck pain

- We found 2 trial (n=147 patients) [Forestier 2007] [Nechtvatal2014]
 - ❖ With low risk of bias but lack of statistical power (lack of recruitment) pulsed electromagnetics fields are more effective than spa treatment
 - At the 6th month
 - For pain and function
 - But not for drug intake and quality of life,
 - With high risk of bias both treatments are superiors to no treatment (lack of randomization, lost to follow up)
 - ❖ With high risk of bias balneotherapy is more effective than rehabilitation program

An aerial photograph of a large, calm lake surrounded by dark, forested mountains. The sky is bright with some clouds. The water reflects the light, creating a shimmering effect. The text is overlaid on the lower part of the image.

**BALNEOTHERAPY FOR
SPONDYLARTHROPATHY (SA)**

Validity in spondylarthropathy



Findings in spondylarthropathy

- We found 8 trial (n=425 patients)
 - ❖ 1 have a low risk of bias (n=120) [Van Tubergen 2001 & 2002] ,
 - ❖ 2 have median risk of bias (n=66) [Cozzi 2006] [Elkayam 2000]
 - ❖ 5 have high risk of bias (n=239) [Altan 2006], [Ciprian 2012], [Codish 2005], [Colina 2009].

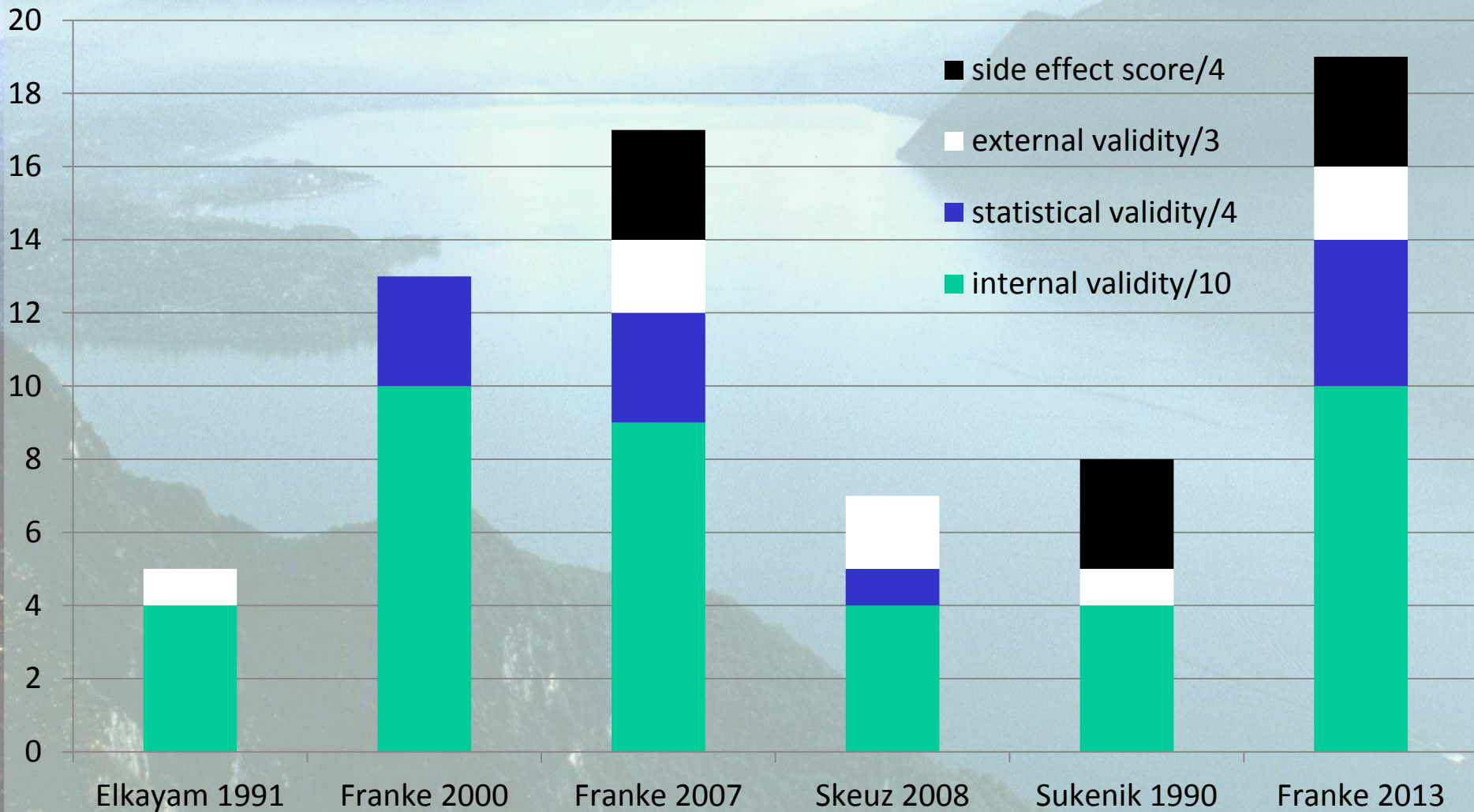
Finding in spondylarthropathy

- In these studies, spa treatment is associated with home exercise and include water exercises.
- In ankylosing spondylitis (AS), improvement is significant until the 3rd month for a pooled score combining BASFI, pain, morning stiffness and patient assessment
- In AS associated to chronic inflammatory disease Improvement of BASAI and BASFI is clinically relevant for patient [Cozzi 2006]
- In psoriatic arthritis, improvement in morning stiffness, tender joint count, number of swollen joint, neck or back pain is significant at 20 wks,

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**BALNEOTHERAPY FOR
RHEUMATOID ARTHRITIS (RA)**

Validity in Rheumatoid Arthritis



Rheumatoid arthritis

- In RA we found 6 trials (n=410 patients), 3 with low risk of bias and 3 with high risk of bias, the best evidence is conflicting
 - ❖ One (n=60) [Franke 2000] shows a surprising worsening in the control group treated with active rehabilitation program in flat water (can partly explain the difference in favor of radon bath)
 - ❖ Another (n=98) [Franke 2013] it found no difference between radon bath and flat water
 - ❖ One (n=137) [Franke 2007] show a better improvement with radon + carbon dioxide bath compared with carbon dioxide bath without radon for quality of life but not for pain, function and drug intake

An aerial photograph of a large, calm lake surrounded by dark, forested mountains. The sky is bright with some clouds. The water reflects the light, creating a shimmering effect. The overall scene is serene and natural.

BALNEOTHERAPY FOR SHOULDER PAIN

Findings in shoulder pain

- In shoulder pain we found one trial (n=46)
- Effect of bath in mineral water + physiotherapy is superior to physiotherapy alone at 13th week
- With high validity and in spite of low statistical power this study shows a significant improvement of patient with shoulder pain for
 - ❖ pain at rest,
 - ❖ pain at movement,
 - ❖ SPADI pain , and
 - ❖ SPADI disability score.

Conclusion

- Balneotherapy improve patients with low back pain , osteoarthritis, fibromyalgia ,shoulder pain, ankylosing spondylitis and RA
- Adding water exercises & modern rehabilitation techniques to traditional balneotherapy may improve the efficacy of this treatment